East Engin. Library

FEB 26 1943

FEBRUARY 25, 1943

The IRON AGE

To keep 'em rolling, flying, fighting!

From training camp to combat service, our fighting forces depend upon millions of ball bearings to help them do their jobs faster and better—to get there "fustest with the mostest."

In the trucks, tanks, guns, planes and ships, and in the instruments and accessories vital to them are vast quantities of ball bearings—bearings carrying loads ranging from many tons to no more than the flick of a fly's wing.

Without anti-friction bearings there could be no *sustained* action by our mobile mechanized equipment because ease of movement, precise functioning and freedom from wear depend on them utterly.

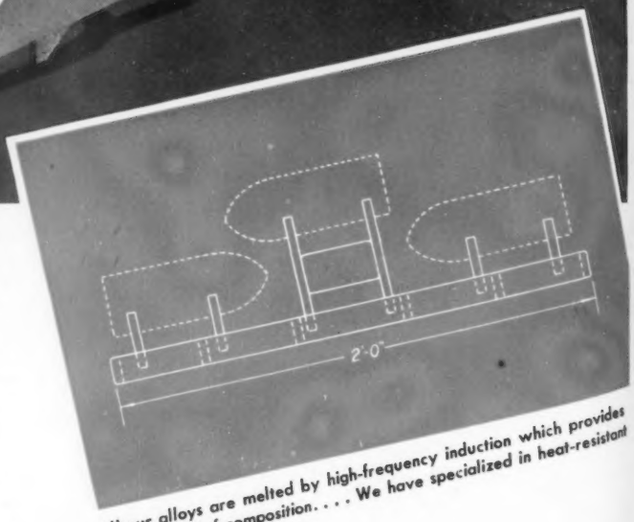
New Departure, a Division of General Motors Corporation, Bristol, Conn.

New Departure

THE FORGED STEEL BEARING

Heat Treated "CALLING CARDS"

THESE "calling cards" will one day announce our arrival at Hitler's door-step. Meanwhile, these projectiles are being heat-treated with the help of these Hoskins Alloy-502 Fixtures that are light but strong. The fixture is about 2 ft. x 1 ft., weighs 42 lbs., and carries 8 projectiles that are 3¼ in. dia. x 8 in. long. The picture shows how these are mounted at two levels. . . . Alloy-502 is of the 35-15 type and is also available as rolled rod. If you need heat-resistant alloy, maybe we can take care of you. . . . Hoskins Manufacturing Company, Detroit, Michigan.



All our alloys are melted by high-frequency induction which provides close control of composition. . . . We have specialized in heat-resistant alloys for 35 years.

HOSKINS PRODUCTS

ELECTRIC HEAT TREATING FURNACES • • HEATING ELEMENT ALLOYS • • THERMOCOUPLE AND LEAD WIRE • • PYROMETERS • • WELDING WIRE • • HEAT RESISTANT CASTINGS • • ENAMELING FIXTURES • • SPARK PLUG ELECTRODE WIRE • • SPECIAL ALLOYS OF NICKEL • • PROTECTION TUBES

HEATING ELEMENT WIRE — Chromel — NICKEL-CHROMIUM

THE IRON AGE, published every Thursday by the *CHILTON CO. (INC.)*. Entered as second class matter November 8, 1932, at the Post Office at Philadelphia under act of March 3, 1879. $8 yearly in North America and South America, Foreign $15. Vol. 151, No. 8.

FEBRUARY 25, 1943
VOL. 151, NO. 8

J. H. VAN DEVENTER
President and Editor
C. S. BAUR
Vice-President and General Manager

o o o

Managing Editor, T. W. LIPPERT
News & Markets Editor, J. A. ROWAN
Technical Editor, F. J. OLIVER
Associate News Editor, D. R. JAMES

Associate Editors
D. C. MacDONALD S. H. BARMASEL
J. I. BUTZNER R. E. BENEDETTO
Art Editor, F. J. WINTERS

Editorial Assistants
M. M. SCHIEN G. B. WILLIAMS
G. P. BUTTERS D. GREENE

Resident District Editors
L. W. MOFFETT Washington
T. C. CAMPBELL Pittsburgh
J. D. BROWNE Washington
W. A. PHAIR Chicago
T. E. LLOYD Cleveland
S. H. BRAMS Detroit
OSGOOD MURDOCK San Francisco

Editorial Correspondents
W. P. DEARING Buffalo
ROBERT G. McINTOSH Cincinnati
G. FRAZAR Boston
R. RAYMOND KAY Los Angeles
HUGH SHARP Milwaukee
JOHN C. McCUNE Birmingham
F. SANDERSON Toronto, Ontario
ROY M. EDMONDS St. Louis
C. H. BACON Seattle

o o o

A. H. DIX, Manager, Reader Service

o o o

Advertising Staff
Robert P. Blair, 621 Union Bldg., Cleveland
B. L. Herman, Chilton Bldg., Philadelphia
H. K. Hottenstein, 1012 Otis Bldg., Chicago
R. Raymond Kay, 2420 Cheremoya Ave., Los Angeles, Cal.
H. E. Leonard, 100 East 42nd St., New York
Peirce Lewis, 7310 Woodward Ave., Detroit
C. H. Ober, 100 East 42nd St., New York
W. B. Robinson, W. J. Fitzgerald } 428 Park Bldg., Pittsburgh
D. C. Warren, P. O. Box 81, Hartford, Conn.
O. L. Johnson, Market Research Mgr.
B. H. Hayes, Production Manager.
R. E. Baur, Typography and Layout.

o o o

Member, Audit Bureau of Circulations
Member, Associated Business Papers
Indexed in the Industrial Arts Index. Published every Thursday. Subscription Price North America, South America and U. S. Possessions, $8; Foreign, $15 a year.
Single Copy, 35 cents, Annual Number, $2
Cable Address "Ironage N. Y."

o o o

Owned and Published by
CHILTON COMPANY
(Incorporated)

Executive Offices
Chestnut and 56th Sts.
Philadelphia, Pa.
U.S.A.

Editorial and Advertising Offices
100 East 42nd St.
New York, N. Y.
U.S.A.

OFFICERS AND DIRECTORS
C. A. MUSSELMAN, *President*

JOS. S. HILDRETH, Vice-President
GEORGE H. GRIFFITHS, Vice-President
EVERIT B. TERHUNE, Vice-President
J. H. VAN DEVENTER, Vice-President
C. S. BAUR, Vice-President
WILLIAM A. BARBER, Treasurer
JOHN BLAIR MOFFETT, Secretary
JULIAN CHASE, THOMAS L. KANE,
G. C. BUZBY, P. M. FAHRENDORF,
HARRY V. DUFFY CHARLES J. HEALE

This Week in . . .

THE IRON AGE

Editorial

By J. H. Van Deventer 35

o o o

Technical Articles

Cold Treatment of Metals 37
Reclaiming Cutting Oil from the Air 43
Maintenance Procedure 44
Coated Abrasive Gadgets Speed Finishing 48
Standard Bending Roll Helps Salvage Electric Cable 51
Plasticized Wood for Aircraft Parts 52
A.I.M.E. Holds Annual Convention 55

o o o

Features

Assembly Line 64
Washington 68
West Coast 72
Fatigue Cracks 76
Dear Editor 78

o o o

News and Markets

This Industrial Week 80
News of Industry 83
Personals and Obituaries 125
Machine Tool Activity 126
Non-Ferrous Metals 128
Scrap Markets 130
Iron and Steel Scrap Prices 132
Comparison of Prices 133
Finished Steel Prices 134

o o o

Index to Advertisers 183

Copyright, 1943, by Chilton Company (Inc.)

SWITCH TO NE STEELS
---with Assurance

Jominy End-Quench Hardenability Testing in Ryerson Lab. All NE Alloy Steels are tested before they are accepted for stock and check tests are conducted to assure accuracy of results. This data is passed on to customers with each shipment.

NE Alloys in Ryerson Stocks
Write for New Booklet

New Technical data — including heat treatment response—is available on NE (National Emergency) Steels. Ryerson tests all NE Steels in stock. This test information is furnished with each shipment of that particular NE Steel. Thus, users can choose which of the lean-alloy steels will best replace the steels of high alloy content previously used.

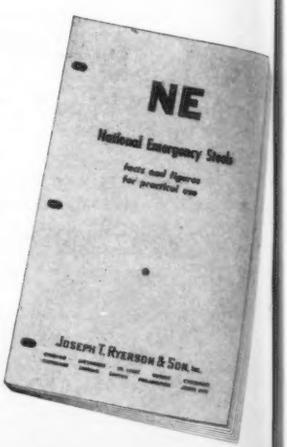
Jominy End-Quench Hardenability Tests, standard for NE Steels, are a quick, reliable method of determining heat treatment response. How this test is made, the results obtained, and how to interpret hardenability in terms of tensile strength, yield point, elongation, and reduction of area, are clearly told in a recent Ryerson publication on NE Steels. Copies are available—call or write your nearby Ryerson plant.

Representative stocks of NE Steels are available at Ryerson for prompt shipment. Turnover is rapid; withdrawals are heavy, but new stocks are constantly being received. Ryerson engineers and metallurgists will gladly answer any question you may have and help you get started with NE Steels.

JOSEPH T. RYERSON & SON, INC.
CHICAGO • MILWAUKEE • ST. LOUIS
CINCINNATI • DETROIT • CLEVELAND
BUFFALO • BOSTON • PHILADELPHIA
JERSEY CITY

★ ★ ★

A HANDBOOK ON NE STEELS
New, complete, authoritative! Compiled by Ryerson. If you are adapting NE Steels to your production and haven't a copy, ask for one today!



RYERSON STEEL-SERVICE

THE IRON AGE

FEBRUARY 25, 1943

ESTABLISHED 1855

Don't Tell the Boss to "Go to Hell"-- But Preserve the Privilege

CONTINUING the thought of the common interest of capital and labor in preserving or rather restoring the fullest possible exercise of freedom of individual choice and action after the war, let's think about the privileges of quitting one job and getting another.

Until one loses that privilege, he does not and cannot realize what a great one it is.

The right to quit is the obverse of job security, of which we hear so much. We do not hear so much about the right to quit and look for a job elsewhere, which is equally important, if not more so.

One of the best examples of job security and in fact of total social security is that of the life term convict. He is assured of clothing, shelter and medical attention for the rest of his unnatural life. He is assured of a steady job and wages. The wages, of course, are not anything to get excited about, but they never are when the state assumes the role of the paymaster of either soldiers, civil service employees or prisoners.

Unfortunately in thinking about things today, we have to separate the war situation which is upon us from the post-war situation which is approaching us. And the two situations are entirely different, or should be. One may have to and probably will have to relinquish his right to quit or his right to hold a given job under war conditions. His employer is not the man who makes up his payroll; his one supreme boss is government. He cannot tell that boss to "go to hell."

In the pre-war days, a man working for General Motors, General Electric, Ford or any other private enterprise did not consider himself as a government employee. If he did not like his boss or the conditions under which he worked he could quit his job. And depending on the nature of his work, there were anywhere from ten to ten thousand other places to go to look for one.

Labor will relinquish its right to quit or to choose during the emergency of war. But I am certain that it will fight to preserve that right after the war. And if it wants to do that it will have to begin now to fight alongside of employers to keep things from being done now under the excuse of war that will inexorably drive us after the war into a socialistic state with one boss, no strikes and no quits.

In succeeding editorials I will try to explore the common ground on which capital and labor can stand shoulder to shoulder to preserve their common heritage of individual freedom.

J. H. Van Deventer

Critical Alloys Lost Forever

If you do not segregate scrap at the source. Each handling increases the difficulties of reclaiming valuable war metals.

Every scrap program should include careful segregation and identification methods that will conserve critical alloying elements and metals. The most effective way to segregate scrap is at the source—at the machines where it is produced—because the danger of mixing increases with each handling. Ferrous and non-ferrous scrap should be collected in separate containers, and each class of alloyed iron and steel scrap should be kept separate so that their alloying contents can be returned to service.

There are many reasons why scrap segregation is of vital importance to America's war effort:

1. Most war equipment requires the use of alloys, many of which are scarce.
2. Segregated and identified scrap can be used for making alloy steels of the same or similar analysis.
3. If alloy scrap gets into a charge of carbon steel, not only are the alloys lost, but the heat may be rejected.
4. Mixtures of various kinds of alloy scrap are often harmful and the alloying elements are completely wasted.
5. Non-ferrous scrap, mixed in iron and steel scrap, not only wastes critical non-ferrous metals, but may cause the rejection of steel heats.

Great quantities of alloys are needed for the production of tanks, guns, planes, etc. Help steelmakers—help manufacturers—help our fighting men, by segregating and identifying every pound of scrap you produce.

Check your scrap segregation methods today—improve them if possible.

ARMY E NAVY

Dedicated to Victory

INLAND STEEL CO.

38 S. Dearborn Street, Chicago • Sales Offices: Milwaukee, Detroit, St. Paul, St. Louis, Kansas C

Cold Treatment of Metals

By W. A. PHAIR
Western Editor, THE IRON AGE

. . . The use of subzero temperatures for producing the temperature differentials required for precision shrink fits is finding increased application in war industry. This article discusses the processing cycles for such operations as practiced in various plants using mechanical units in place of dry ice. It also touches upon the use of cold for stabilizing gage metal and describes some of the equipment available for producing subzero temperatures.

JUMPING from the frying pan into the ice box is becoming a literal fact in the metal industry today as researchers probe more deeply into the potentialities of the treatment of metals by subzero temperatures. This renewed interest is bringing many new and intriguing possibilities into view and already suggests that cold treatment as a phase of steel processing will loom importantly in the future.

Broadly speaking, this interest in subzero temperatures is along two approaches. One is the theoretical investigation of the effect of temperatures of, say —100 deg. F. and lower, on such characteristics of metal as ductility, hardness, change in volume, etc., or, to use an all inclusive phrase, the stabilization of the metal. The second aspect of cold treatment is the practical use of the shrinking effect of low temperatures on metal for the purpose of providing temperature differentials, without resorting to high temperatures, for giving close fits between two mating parts in assembling.

It is with this latter development that this article is primarily concerned since it is this use that appears to have chief application to the immediate problem of producing war materials.

Another use of cold, that of preventing hardening of certain annealed aluminum parts such as rivets, is accepted practice today but generally does not involve temperatures as low as the other applications to be discussed here and is not as recent a production development.

Probably the chief influence in stirring up interest in the possibilities of putting cold to work in metal processing has been the recent development of industrial refrigerating units which make possible the maintenance of temperatures down to —120 deg. F. for long periods with very close control. Cold has been used in the past for such operations as the "stabilization" of gages, but such activities have revolved around the use of dry ice. Quite aside from some of the objectionable features of handling dry ice, it is difficult to achieve and hold within minor limits a temperature above, as well as below, the natural temperature of dry ice. This has obviously militated against greater interest in the subject. Too, the modern industrial cold treating units make available temperatures below that of dry ice and with the added advantage of close control.

From a laboratory viewpoint, cold treatment has been something of a stepchild, possibly because there appeared to be more fertile areas in other fields of investigation. There have, however, been several notable stabs in this direction. But as most of these investigations have involved the use of dry ice or liquid nitrogen to achieve the low temperatures, there has been a natural obstacle to the direct use of this knowledge in fabricating processes.

A study of the use of cold in a number of outstanding plants reveals a lack of uniformity in practice, likely due to the fact that the pressure of war demands often prevents the experimentation which many plants would like to undertake to establish basic facts. In most cases, the trial and error method has been used to establish a routine which will give the required shrinkage for fitting operations. Once this has been achieved, the procedure has been stabilized at that point.

This lack of uniformity makes it difficult to establish a base from which a new user of low temperatures may proceed to establish a practice for his specific product. It is hoped, however, that publication of this material will spur discussion of the subject and this in turn should aid in developing a better understanding of the basic principals involved.

The data on shrink fits presented in this article have been accumulated from a number of machine tool and aircraft parts manufacturing plants. It will be noted that there is little common ground in the practice of the various plants, except possibly a broad agreement as to temperature. Practically every plant involved noted specifically that the use of subzero temperatures for shrink fits was still in the experimental stage and much research will be necessary before full utilization of this process will be realized.

The advantages of shrinking for a fit, rather than expanding by

FIG. 1— A 2 in. machine tool shaft being placed in a portable chilling cabinet which will shrink it about 0.001 in. in 40 min. at —50 deg. F. to permit fitting a bearing on it.

means of elevated temperaures, appear to be several in number. One is that it is felt that there is less possibility of altering the characteristics of the metal by cooling than by heating. Secondly, there appears to be less possibility of distortion of parts with varied section size in chilling than in heating. Another factor is the greater ease of handling chilled parts as compared with heated parts in making fits of small as well as large parts. Where large tolerances are required, the necessary temperature differential can be achieved without resorting to excessively high temperatures by chilling one section and slightly heating the other.

Rate of Shrinkage

While it is obvious that the rate of shrinkage is dependent upon mass and also upon the specific characteristics of the metal involved, the data given in Table I indicate the relative degree of shrinkage in a 2-in. ring in six common metals. These data were supplied by the Deepfreeze Division of Motor Products Corp. It is not certain whether shrinkage rates of sizes other than that covered by Table I will be directly proportional to differences in size, but it is probably safe to assume that the rate for other sizes is roughly proportional.

Shrinkfit applications usually involve the chilling of the inserted part only, although some practices call for heating the female part slightly and chilling the mating section. In most cases, it is possible to insert the male part by hand, with a tight fit resulting as soon as the part has returned to room temperature. In one aircraft plant it is the practice to make use of chilling and a press fit, it having been found that the chilling of one part made it possible to use greatly reduced press pressures, as compared with a straight press fit without chilling. This, obviously, reduces the chances of scoring or distortion in the fitting operation.

Immediately following is the procedure adopted by an aircraft plant for fitting both aluminum to aluminum and aluminum to steel. In each case one part, the female part, is heated to between 300 and 450 deg. F., while the male is chilled to between —35 to —40 deg. F. The tabulation below gives the minimum and maximum shrink fit on the parts, the type of metals involved and the basic size.

A.—Alumimum alloy liner, shrink fit, 0.005 minimum, 0.007 maximum, into an aluminum alloy body. Basic size is 2.285 in., (0.75 in. long).

B.—Nitri-cast iron liner fitted into aluminum alloy body. Shrink fit is 0.003 in. minimum, 0.005 maximum. Basic size is 3.407 in. (4.0 in. long).

C.—Nickel cast iron liner into aluminum alloy body. Shrink fit is 0.004 in. minimum, 0.006 in. maximum. Basic size 1.822 in. (1.75 in. long).

D.—Bronze bushing into a magnesium body. Shrink fit is 0.0015 minimum, 0.002 in. maximum. Basic size is 0.437 in. (2½ in. long).

E.—Aluminum alloy core into a steel liner. Shrink fit is 0.0035 in. minimum, 0.008 in. maximum. Basic size is 3.062 in. (2.75 in. long).

F.—Nitri-cast iron liner into an aluminum alloy body. Shrink fit is 0.004 in. minimum, 0.006 in. maximum. Basic size is 3.002 in. (2.75 in. long.)

G.—Steel bearing sleeve into an aluminum alloy body. Shrink fit is 0.004 in. minimum, 0.006 in. maximum. Basic size is 1.565 (1.5 in. long).

H.—Steel liner into a magnesium body. Shrink fit is 0.002 in. minimum, 0.006 in. maximum. Basic size is 3.440 in. (4.0 in. long).

I.—Steel bushing into an aluminum alloy body. Shrink fit is 0.003 in. minimum, 0.005 in. maximum. Basic size is 0.468 in. (0.625 in. long).

Another aircraft plant which inserts steel and brass liners and bushing in aluminum crankcase sections and cylinder heads, reports that its practice is always to chill the inserts to —30 deg. F. and heat the aluminum parts to 300 to 400 deg. F. The inserts are chilled for two or three hours to insure uniform temperature conditions. This plant also reports that it inserts a bushing in a heat treated articulated rod by chilling only the bushing and using a light press fit.

One aircraft manufacturer, reporting its experience with chilling equipment, pointed out that its practice had been evolved by trial and error

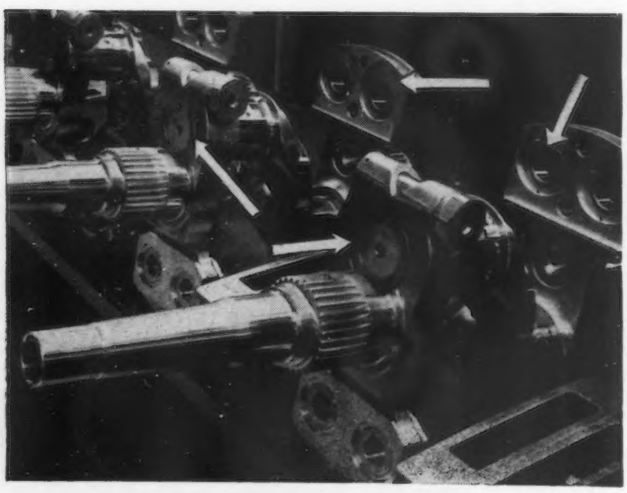


FIG. 2—Dowel pins, spline pins, counterweight bushings and center section end plugs are fitted into these aircraft engine crankshafts by chilling. Arrows point to some of these parts.

and while this gave a fairly satisfactory operation, more intensive research, when time was not so short, might well result in higher efficiency in the operation.

This company is shrinking a steel liner into a steel flywheel of an aircraft engine starter. The liner is put into a cold chamber with a normal outside diameter of 2.996 in. and is shrunk to 2.995 in. This shrinkage is obtained with a 1-hr. treatment at —40 deg. F., with one immersion.

While the liner is in the cooling unit, the steel flywheel is heated to 400 deg. F. for 1 hr., resulting in an expansion of about 0.002 in. on the inside diameter, giving a total clearance for the two parts of 0.003 in. The parts are fitted together in an arbor press to obtain alinement of the parts when pressed. Very little pressure is required for this purpose. Before chilling was adopted, a much heavier press was required and the fit was not as satisfactory as it is now using a chilling treatment and a light press.

In order to obtain a better bite in the flywheel when the two parts have returned to room temperature, the steel liner is knurled on the outside diameter before chilling.

Machine tool plants are also making use of this equipment for shrink fits. One mid-western shop shrinks a 2-in. spindle for fitting into a bearing. This 2 in. spindle, shown in Fig. 1, is shrunk from 0.001 to 0.0015 in. in 40 min. at —50 deg. F. This plant also makes use of this equipment for shrinking a steel sleeve type bearing used in a cast iron housing. This bearing is turned 0.0005 in. oversize, then shrunk about 0.001 in., the exact figure depending on the mass of the bearing, and inserted into the bearing housing. When the bearing regains room temperature, an accurate, tight fit results. Aside from the lack of need of handling dry ice, the advantages of this practice are listed as saving time in assembling the unit and absence of out of roundness and misalinement caused by excessive pounding on the bearings necessary during assembly by previous methods. This company uses a portable chilling unit, shown in Fig. 1, which makes it possible to bring the unit to the job.

FIG. 3—Aluminum rivet holding unit at a Ford aircraft plant. Doors are operated by foot pedals.

A company producing crankshafts for aircraft engines employs cold for fitting dowel pins, spline pins, counterweight bushings and center section end plugs. These parts are subjected to a temperature of —25 deg. F. for 2 hr., after which they are immediately assembled into the crankshaft and permitted to return to room temperature. So effective is this type fit that the center section end plug, after it has expanded to

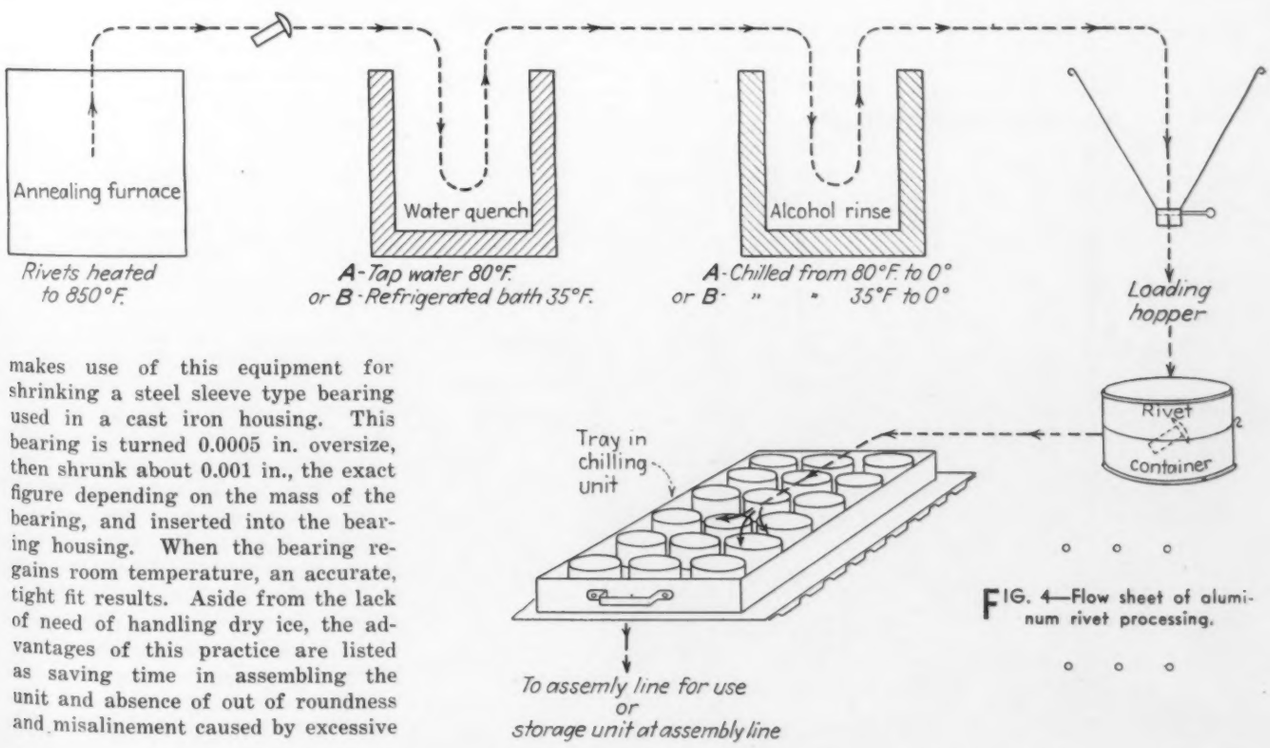


FIG. 4—Flow sheet of aluminum rivet processing.

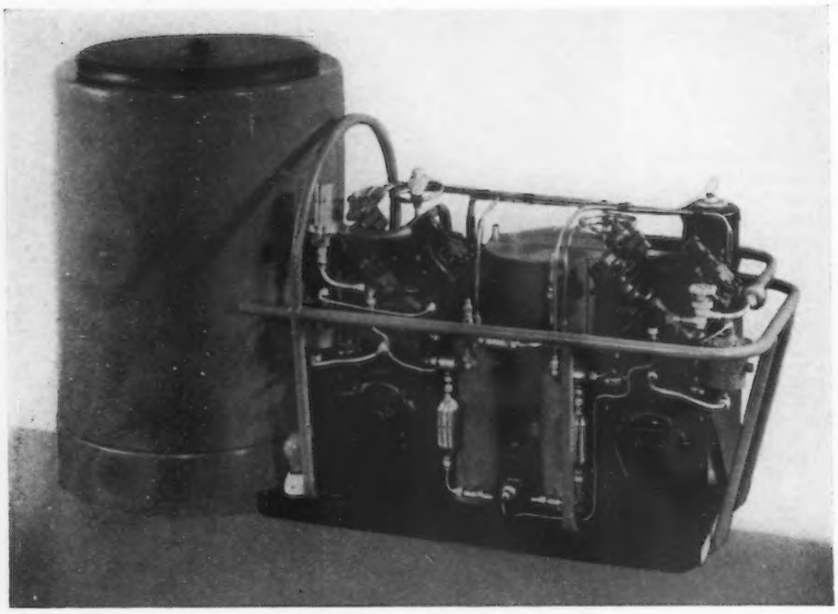


FIG. 5—Deepfreeze Santocel Cascade chilling unit which will give temperatures down to —120 deg. F.

o o o

room temperature, fits snugly enough to form an oil tight seal.

The cooling chamber of the chilling unit used by this company is filled with an alcohol-base liquid. The tray on which the parts are placed is of wood and holds the parts over the liquid. The liquid at no time touches the parts. The company reports that it has never had a part crack in this treatment.

The diameter of the parts treated by this company are: Dowel pins, 0.375 in.; spline pins, 0.187 in.; bushings, 2.1875 in.; and end plugs 2 in. The shrinkage of these parts is based on 0.000006 in. per degree per inch of size. These parts are shown in Fig. 2. The dowel pins are small pins on the radius of the throw, directly behind the propeller shaft. There are two to a shaft and are in the same plane and radius on the throw as the oil holes which can be seen in the illustration.

In addition to chilling for precision fits, an interesting case is reported wherein low temperatures are employed for inserting non-precision bearing cuts in position. These cups are chilled by placing them in a solution of 50 per cent kerosene and alcohol which is brought down to —40 to —50 deg. F. This treatment results in a shrinkage of from 0.002, to 0.003 in. on the diameter. This allows inserting the cups by hand, which, it is claimed, is faster on this job than machine pressing or driving and ends the possibility of strains developing by driving the cups in cocked.

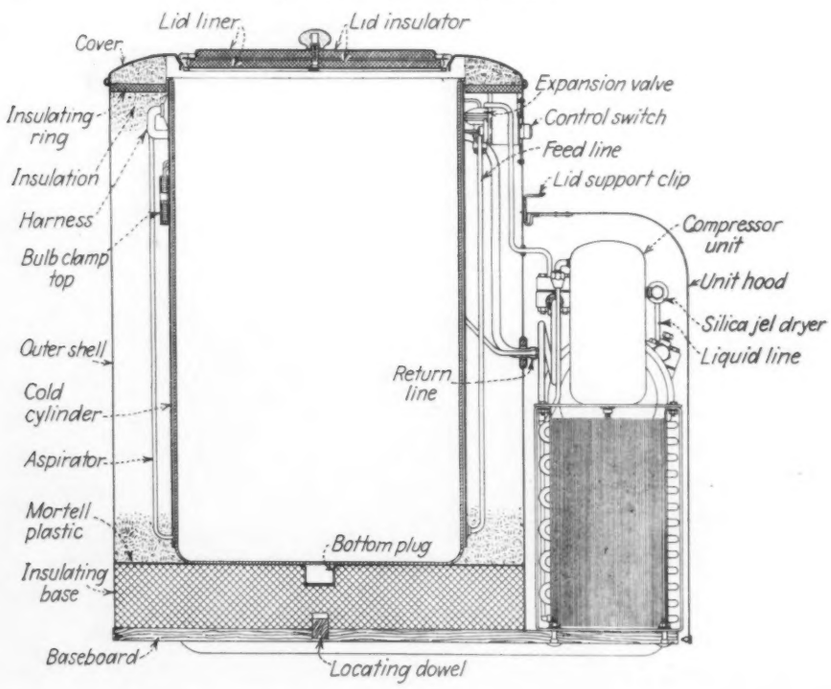
Seasoning or stabilizing gages and mandrels by cold treatment has been a rather common practice for some time in many plants. The purpose of such treatment, which in the past has largely involved the use of dry ice, is to insure dimensional stability of the product or, to express it another way, to prevent excessive expansion of the gages due to minor variations in ambient temperature.

Several gage makers have recently installed mechanical refrigerating units and some are experimenting with temperatures somewhat below that available with dry ice, although most stabilizing treatments at present are in the range of —25 to —50 deg F.

In this stabilizing practice, as in shrink fittings, there appears to be a lack of fundamental information and consequently there is a good bit of variance in practice between various shops. However, in at least one direction extensive experiments are being undertaken and some very useful basic data should be available in the next six months.

o o o

FIG. 6—Cutaway sketch showing construction of a Deepfreeze unit which will give temperatures down to —50 deg. F.



Gage Seasoning

One authority on gage seasoning reports the following dry ice procedure* "The gages are hardened, then heated to about 300 deg. F. and allowed to cool to room temperature. After cooling, they are packed in dry ice (which will cool them to about —105 deg. F.). This cycle is repeated 4 or 5 times, allowing the gages to return to room temperature each time between the dry ice and the 300 deg. F. treatment."

"Users of this process," the report states, "seem to have no definite rules as to how long the parts should be exposed to the dry ice, but as the sections increase in size, the time of

* *Aging Tools and Gages*, METALS & ALLOYS, *Feb. 1942, p. 278.*

exposure is increased accordingly. Four to five hours seem to be the average time of exposure for medium sized parts."

This lack of agreement among dry ice users was also reflected in the writer's efforts to arrive at something approaching a standard practice with mechanical cold producing equipment. One plant reported using 10 cycles, alternating between —40 deg. F. and 200 deg. F., while another plant uses four cycles between —25 deg. F. and room temperature. Still a third plant advises that a single treatment at —50 deg. F., held for several hours, and then returned to room temperature, is usually sufficient.

One manufacturer has adopted the following practice. The gages are rough ground after hardening and then placed in a chilling unit for about 48 hr. They are then removed and finished lapped to size.

A variation of this practice in another plant is to grind the part to within 0.002 in. of finish size, then chill for 6 to 8 hr. at —40 deg. F., then returned to 70 deg. F. or, about room temperature, and finish ground and lapped to size.

Another gage maker advises a temper at 300 deg. F., chilling to at least —70 deg. F. and then back to room temperature, after which the piece is finished ground and lapped.

Another plant recommends a treatment of 24 hr. at —50 deg. F. followed by finishing grinding.

An interesting comment is from a plant making gages, mandrels and similar tools of B & S stock, drill rod of 1.10 C, and also from a material running 0.50 C, 1.50 Cr and 2.25 W.

The seasoning cycle used in this plant is as follows: Harden and quench; draw at 350 deg. F., for one hr. (for small sections); allow to come back to room temperature; place in chilling unit at —45 deg. F. or lower for 15 hr.; back to room temperature; then place in boiling water for 2 hr., then bring back to room temperature. Repeat for two or more cycles, beginning with the chilling treatment.

The company's experience with this treatment is that arbors and mandrels, etc., subjected to this seasoning show considerably less runout than parts which have not been so treated.

The variances in the seasoning treatment reported here cannot be accounted for by differences in size or composition of the material treated. Probably the best analysis of the situation is the assertion of one firm that they "are using by-guess and by God methods now. These are working out well and they haven't time to experiment to determine what it is all about." Another firm reported that they had only heard about the method this year and were making use of the manufacturer's recommendations, pending the outcome of some small scale experiments that were currently being undertaken.

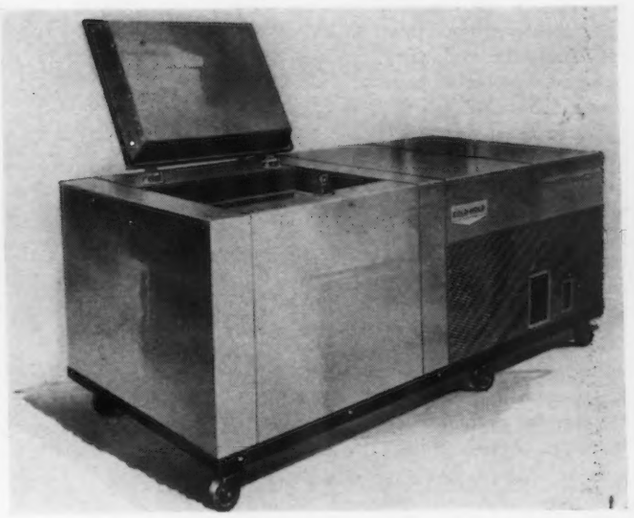


FIG. 7—A Kold-Hold horizontal unit of 5 cu. ft. capacity for temperatures down to —75 deg. F.

The use of low temperatures for retarding the aging, or hardening of certain types of heat treated aluminum, such as rivets of 17S-T or 24S-T alloy, is well known in industry. If such alloys are held at room temperature they will gradually harden, lose shear strength and become very difficult to drive. The Aluminum Co. of America has reported that rivets stored at 32 deg. F. immediately after quenching remain soft enough for driving for about 36 hr., while if stored at —50 deg. F., the rivets remain soft enough for driving for two weeks or more.

The Ford Motor Co. recently ran a number of tests to determine how long such rivets could be held under plant conditions. Rivets of 17S-T alloy, ⅜ to ¼ in. in size were stored in a mechanical chilling unit for 50 days. An examination of the rivets after this time showed that while there was some hardening, it was still possible to drive the rivets. The chilling cabinets used for the tests were similar to the units used throughout the plant for storing rivets and other aluminum stock,* in which the temperature is maintained within the range of 0 to —10 deg. F.

** A detailed description of the technique of cold storing aluminum sheets is contained in the article "Unique Aircraft Construction Methods," THE IRON AGE, June 25, 1942, p. 33.*

The Willow Run bomber plant of the Ford Motor Co., where the handling of such material is a real problem, has developed a highly effective procedure for storing such alloys at the required temperature. In view of the increase in interest in this subject, it might be well to review in detail the Ford setup, which deals exclusively with 17S-T rivets.

A major storage depot for rivets, known as a rivet crib, is setup in

FIG. 8—A Kold-Hold unit which combines a hot bath of up to 200 deg. F. and a cold bath of down to —70 deg. F. in a single machine.

the center of the cold-heading and heat treating departments. After the rivets are headed, they are delivered to these special storage units. These units are rated at 1600 lb. capacity and are fed by three-ton compressors built integral with the box. Each unit is divided into nine compartments, each compartment containing 12 sliding trays. These boxes are constructed so that when the outer door is opened, it does not affect the temperature of the trays.

Each tray has room for four containers in which the rivets are kept. These containers are tubular in shape, 2½ in. in diameter by 11 in. long, cadmium plated and will fit any cold unit or tray in the plant.

Deliveries are made from the crib to the smaller boxes along the assembly lines by a scooter which is equipped with a small container cooled by dry ice. A very little increase in temperature is reported during this transfer. The assembly lines are equipped with 48 small cold units, five of which are of 10 cu. ft. capacity (See Fig. 3) and the rest 2 cu. ft. The 10 cu. ft. units measure 4x3x10 ft. and have 1½-ton compressors. They are built with two chambers, each with its own door which can be raised or lowered by a pneumatic control operated by foot. The smaller boxes measure 22x33x45 in. and are also opened mechanically by a foot pedal. They are also equipped with 1½-ton compressors.

All the boxes are capable of maintaining a temperature of —45 deg. F. However, the main storage crib is maintained at —20 deg. F., while the floor units are standardized at 0 to —10 deg. F. It is expected to eventually expand this setup to 100 small units and a fleet of scooters.

Each small container is marked with type of rivet and date. The rivets are removed from the container by hand, a half-dozen at a time just before driving. A flow chart showing processing of aluminum rivets as recommended by Revco, Inc., is shown in Fig. 4. This company's automatic dispenser makes use of a small fiber and metal container 2⅞ in. O.D. by 1⅞ in. high.

Tool Steel Hardening

In addition to the practical applications listed previously in this article, there is another rather intriguing angle in cold treatment of metal which is still definitely in the laboratory stage. This is the treating of tool steels with the aim of improving their physical characteristics at operating

FIG. 9—A Revco special rivet holding cabinet for holding rivets in cans or cartridges at —40 deg. F.

o o o

temperatures. As a result of work done by Gordon and Cohen * on low temperature treatment of 18-4-1 steel, it appears that one of the advantages of suitable cold treatment of such steel is a reduction in loss of hardness at operating heat. When tool steel heats due to friction from the cutting operation, it looses some of its original hardness. With proper cold treatment, it appears that this loss can be considerably reduced.

** Paper by M. P. Gordon and Morris Cohen, entitled "Transformation of Retained Austenite in High Speed Steel at Subatmospheric Temperatures," ASM 1941 preprint. This paper contains an excellent discussion of the basic metallurgical aspects of cold treatment and is must reading for anyone interested in this subject.*

While the work done by Gordon and Cohen involved temperatures as low as —310 deg. F., or below the range of commercially available refrigerating equipment, they point out that from a practical viewpoint it is not necessary to resort to temperatures as low as —310 deg. F. to achieve subatmospheric transformation (or stabilization) in hardened high speed steel. It was indicated that that transformation stops below —150 deg. F. In fact, only a small amount occurs below —100 deg. F., a temperature readily obtained with several industrial types of refrigeration now available.

An interesting conclusion drawn by Morris and Cohen is that "subzero hardening and tempering of 18-4-1 high speed steel will produce combinations of hardness, strength and ductility unattainable by ordinary hardening and tempering." It is understood that this work is going to be carried farther, with particular reference to gage steel stabilization.

While, as has been previously noted, most of the present applications of cold are in the range of temperatures above the maximum attainable by dry ice, there are several factors which make mechanical chilling equipment more efficient for cold applications as compared with dry ice. One important factor is the closer control over temperatures possible with the mechanical units. One maker of chilling units claims to be able to control the temperature within 3 deg. There is also the factor of greater ease in handling a mechanical unit, as against dry ice. Many types of portable units are available which need only be plugged into a power source to be operated. It is also claimed that a mechanical unit, operating under comparable conditions, will provide the required cold much more economically than dry ice.

There are a number of manufacturers of mechanical chilling equipment in the field currently, including several large household and commercial refrigerator makers who are somewhat coy toward admitting they have made industrial low temperature applications.

The Deepfreeze Division of Motor Products Corp., North Chicago, Ill., are marketing two types of cold equipment. One is the Santocel Cascade chilling unit which will give temperatures down to —120 deg. F. This is illustrated in Fig. 5. This unit has a double walled cold chamber, with 24 in. inside diameter and 30 in. deep, giving a capacity of 58½ gal. or 7 4/5 cu. ft. It is insulated with 4 in. of Santocel insulation and has two open type, silent valve head, water cooled piston type compressors. Deepfreeze also produces a Santocel chilling unit, Fig. 6, which gives temperatures of from —40 to —50 deg. F. This unit has a capacity of 33 gal. or 4½ cu ft. It has one compressor. The heat absorbing capacity

TABLE I
Rate of Shrinkage

Approximate Shrinkage in 2-in. Ring or Cylinder Inserts With the Parts Being Chilled from 70 deg. F. to —100 deg. F.	
Tool steel	0.0022 in.
Phosphorus bronze	0.0032 in.
Aluminum bronze	0.0032 in.
Brass	0.0036 in.
Aluminum	0.0043 in.
Magnesium	0.0045 in.

of the Cascade unit is equal to 196 lb. of dry ice at —120 deg. F., limited to —90 deg. F., per 24 hr. under similar operating conditions. In this unit there is very little difference between the temperature of the refrigerant and the storage area—less than 2 deg. This is said to reduce condensation and frost.

Another manufacturer is the Kold-Hold Mfg. Co., Lansing, Mich. This company produces units in vertical and horizontal models ranging from 2 to 11 cu. ft. These machines are available in temperature ranges of —45, —60, —75 and —90 deg. F. This company reports that electric energy consumption of these units will average between $4 and $10 per month, depending upon size. A Kold-Hold horizontal unit of 5 cu. ft. capacity is shown in Fig. 7. This machine is made in two types, —75 deg. and —90 deg., and in 5 and 11 cu. ft. capacity. These units are entirely self-contained and require no recharging or refilling.

The Kold-Hold model illustrated in Fig. 8 combines both hot and cold chambers in one unit, making it possible to heat parts in one chamber and transferring them to the cold chamber without loss of time. The unit is entirely self-contained and gives temperatures, in the respective baths, of up to 200 deg. F. and down to —70 deg. F., with sensitivity controllable to ±1 deg. Agitators assure thorough distribution of the heat and cold.

Revco, Inc., Adrian, Mich., reports its equipment will give temperatures down to —50 deg. F. and lower. Its standard heavy duty cabinets, Fig. 9, are available in capacities of 3, 5 and 7 cu. ft. The company also makes a light portable cabinet with a capacity of 1½ cu. ft.

o o o

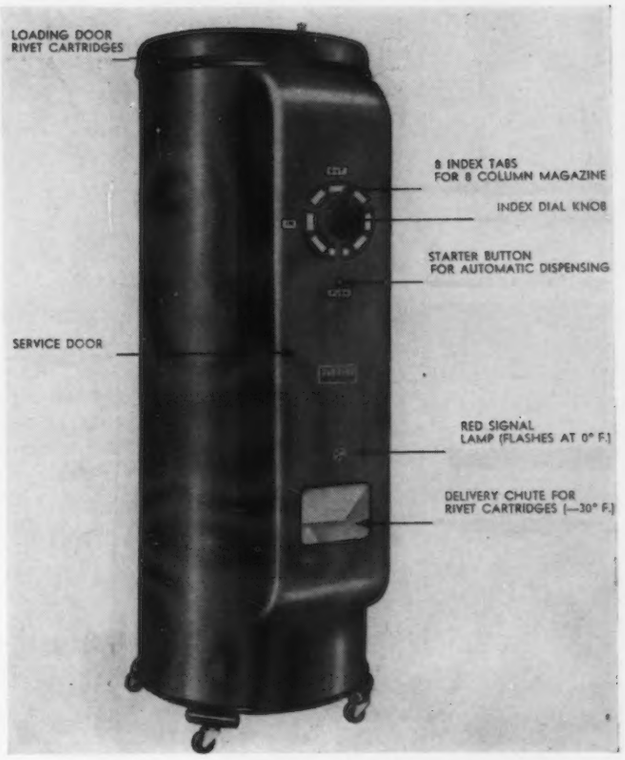


FIG. 10—A Revco selective automatic rivet dispenser which dispenses up to 15 cans of rivets per minute cooled to —30 deg. F. with up to eight type or size selections.

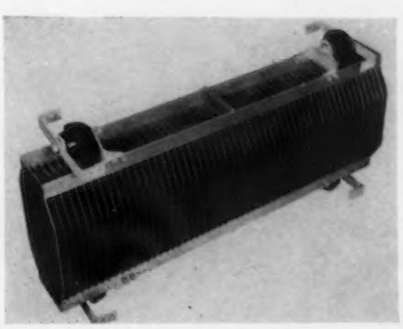
o o o

Revco recently introduced the selective automatic rivet dispenser shown in Fig. 10. In this unit rivets are stored in cartridges holding about ¼ lb. of rivets. These containers have metal bottoms and waxed interiors and exteriors and may be reused. Use of these cartridges prevents moisture from getting at the rivets, eliminates spillage and prevents mixing of aged rivets. The operator dials the desired type or size of rivet, presses a button and receives a cartridge of rivets cooled to —30 deg. F. The unit has eight storage columns, permitting the storage and delivery of eight different types or sizes of rivets.

To stave off irate sales managers, it should be stressed here that the notes on these industrial units apply to standard models only and all companies have produced custom built units differing from those described here. In fact, probably most of the units being sold today are modifications of standard designs to fit specific production problems. Some of the specialties which these companies have turned out include blood plasma freezing units and stratosphere units for testing aircraft parts.

Reclaiming Cutting Oil from the Air

HIGH speed machine tools like automatics must be flooded with cooling oil, sometimes at a rate of 5 gal. per min. Much of the oil pouring on a fast-spinning tool is whipped into a fine spray, and the hot chips and tool paints may even turn the oil to smoke. With row after row of these machines in screw machine departments the air becomes filled with spray and smoke. The oil-laden air is drawn upwards toward the exhaust-air intake but on the way it condenses on lighting fixtures, in bus ducts, on electrical insulation, walls and other surfaces. Even if the oil mist is caught by the air-conditioning system, the harm is done before the oil reaches the intake ducts.



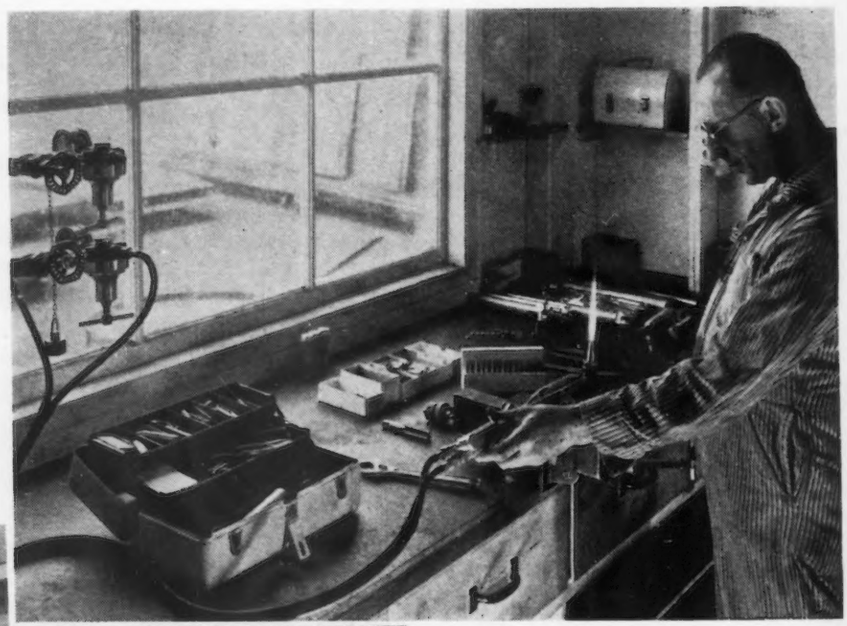
HIGH voltage plate assembly for Westinghouse Precipitron installation. This type unit, designed primarily for removing dust and dirt from the air by electrostatic precipitation, has been applied successfully in recovering cutting oil fumes and vapor around automatic screw machines.

An obvious solution seems to be to remove the vaporized oil at the individual machine. With a Precipitron electrostatic separator, built into the machine tool itself, in a trial installation on one machine, Westinghouse engineers filtered 4 to 5 gal. of cutting oil out of the air in one day. Visibility is improved, building maintenance is greatly reduced, and the life of power and light cables and controls is lengthened by the Precipitron installation. The air is more healthful and a worthwhile saving is realized on cutting oil, a critical material.

. . . MAINTENANCE

THERE is no need at the present time to re-state the necessity for conserving oxyacetylene welding and cutting apparatus to obtain the utmost in life and productivity from them. Even those users having the highest priority ratings are actively promoting conservation, so that the comparatively less essential industries will be able to secure at least some part of their needed replacements. What is needed now are ways and means of planning apparatus maintenance and control on an organized basis.

This article describes a number of such systems, as applied to oxyacetylene welding and cutting apparatus.



UPPER LEFT

FIG. 1—This card index contains a complete case history of each piece of oxyacetylene welding and cutting apparatus.

o o o

ABOVE

FIG. 2—Maintenance inspections are not haphazard, as this careful checking of flame balance in a cutting tip indicates.

o o o

LEFT

FIG. 3—After inspection, apparatus is stored in bins for issuance to shop personnel. A record is kept of any repairs made.

PROCEDURE

By FORREST WALDO
Applied Engineering Department,
Air Reduction Sales Co., New York

For Gas Welding and Cutting Apparatus

. . . The useful life of vital oxyacetylene welding and cutting apparatus may be substantially extended and its productivity maintained at a high level through the use of carefully planned maintenance and control systems such as are described in this article. Practices are taken from West Coast shipyards.

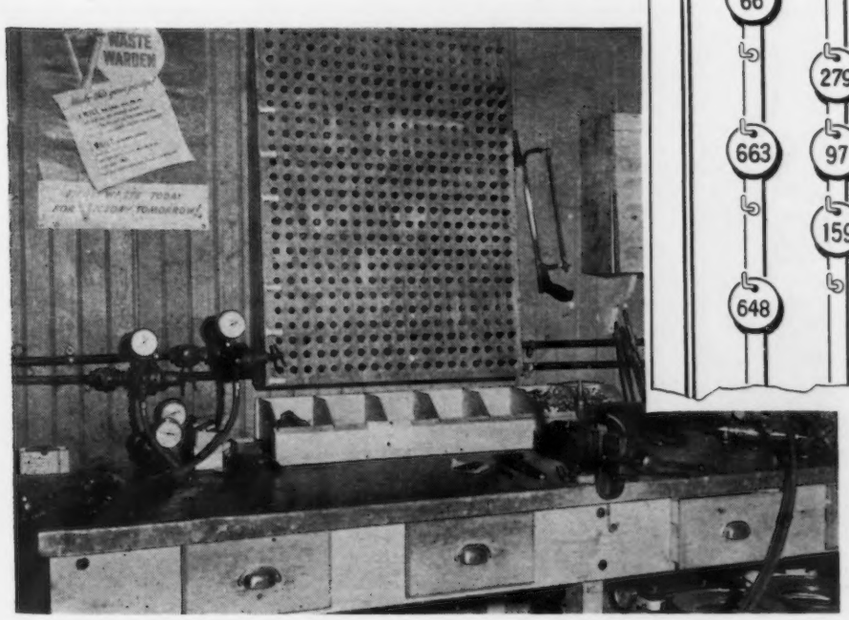
These systems were developed in several shipyards, where the large quantities of apparatus in use necessitated a comprehensive approach to the problem. However, they are applicable either directly or with partial modification to steel mills, which are likewise heavy users of oxyacetylene equipment. It is not the intention to suggest these maintenance and control programs as superior to those now in use in many mills, but more in the light of "borrowing an idea" where this is feasible.

In general these systems encompass the following main purposes: Keeping all apparatus in efficient operating condition; preventing or minimizing loss of equipment; keeping a case history of each piece of apparatus; and maintaining a constant check on location of both equipment and operators. It will be seen that other benefits are forthcoming as by-products of such a program.

The core of the apparatus maintenance system is the card index file shown in Fig. 1 Every torch, regulator or other piece of equipment has its card in this file, bearing all identifying data and a complete history of all the inspections and repairs made upon it. The most important feature of this system is that inspections figure more prominently than repairs. In other words, all apparatus is subject to periodic inspection at reasonable intervals, regardless of whether it has shown definite need for repair. Such regular overhauling serves two purposes: It maintains a higher level of performance efficiency, and it frequently forestalls actual breakdowns and major repairs.

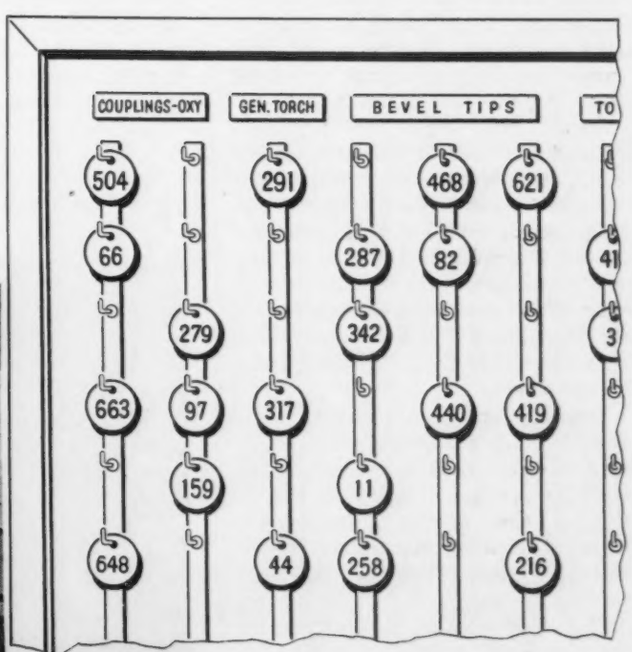
The card index, showing the date of last inspection of each piece of apparatus, provides a check not only on such equipment as is regularly returned to the storeroom, but also on equipment which is permanently installed elsewhere in the shop and yard, or which may circulate about the working areas without being returned to stores.

Inspection means more than a cursory once-over. Apparatus repair-



RIGHT

FIG. 5—This is a corner of the apparatus check-out board in the storeroom. Each hook represents a piece of equipment.



LEFT

FIG. 4—Cutting tips are kept in an orderly rack to prevent damage to seating surfaces or flame orifices, thus promoting long life and high efficiency.

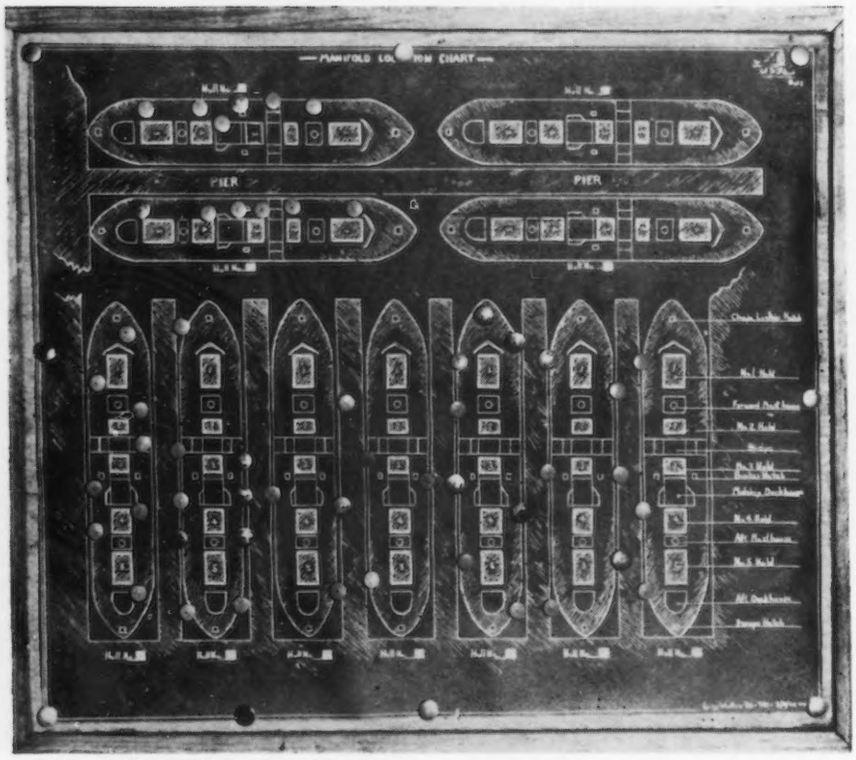


FIG. 6—Thumbtacks on this board represent locations of portable oxyacetylene manifolds at ship ways and outfitting docks at a shipyard

men are experienced operators of the equipment passing through their hands, and in addition they have a knowledge of the inner workings of that equipment. Where practicable, inspections include actual operating tests. In the case of torch tips, for example, the tips are regularly cleaned and checked for flame adjustment, as shown in Fig. 2. Oxygen and acetylene regulators are inspected for leaky seats, thus avoiding regulator creep. Whenever anything more than minor adjustments are made, the nature of the repairs is entered on the file card, which thus bears a complete case history of that particular piece of equipment.

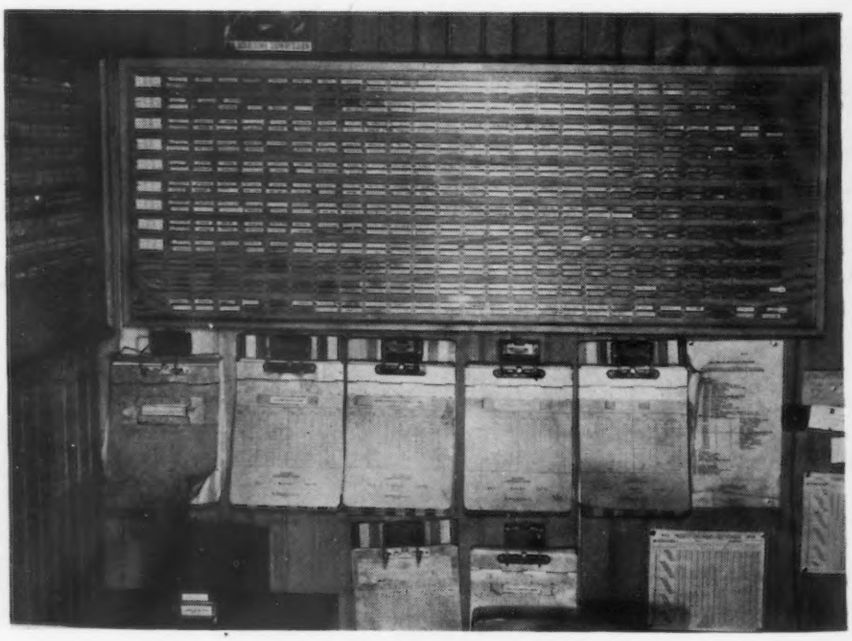
Inspected apparatus ready for issuance to shop personnel is stored in separate bins or compartments. One such storage rack is shown in Fig. 3. Cutting tips receive special care, since mishandling may easily impair their efficiency. These are filed according to size in a special board, drilled with rows of holes to receive the tips, as illustrated in Fig. 4. Similar racks are provided for welding tips, both for the sake of orderliness and to avoid battering the seating ends.

Maintenance and control go hand in hand again in the issuance of the apparatus. Reference to Fig. 5 shows how this is done. The apparatus check-out panel has rows of small hooks, each representing a particular piece of equipment. Labels at the top of this board identify each type of torch, tip, radiagraph, etc. When a worker receives his tools from the storeroom a metal tag bearing his number is hung on the appropriate hook. He is then held responsible for the return of these tools, and he is, of course, aware of this fact. This system is simple, rapid and involves no paper work. The amount of time required in keeping this transitory record is negligible.

Another aspect of the system employed at one yard is almost exclusively a shipyard problem, but it is readily adaptable in one form or another to other industries as well. This is a visual chart showing at a glance the locations and distribution of portable oxyacetylene manifolds around the yards. Fig. 6 shows this panel, with thumbtacks used to represent manifold gas outlets. This chart, together with the man-location chart shown in Fig. 7, provide a simple means of ascertaining where work is being done, the workmen engaged in that work, and the equipment in use at those points. This system obviously serves other purposes as well as control of apparatus. In cases of emergency, for example, where a welding job must be done in a hurry, the shop superintendent can determine in a moment, which crew to withdraw for such work.

A final aspect of the control program is worthy of description, though it concerns gas consumption records rather than apparatus maintenance. This is a wall chart on which are plotted monthly figures of oxygen and acetylene consumption, by both

FIG. 7—This man-location chart provides a simple means of ascertaining where every welder and cutting operator is working in the yards.



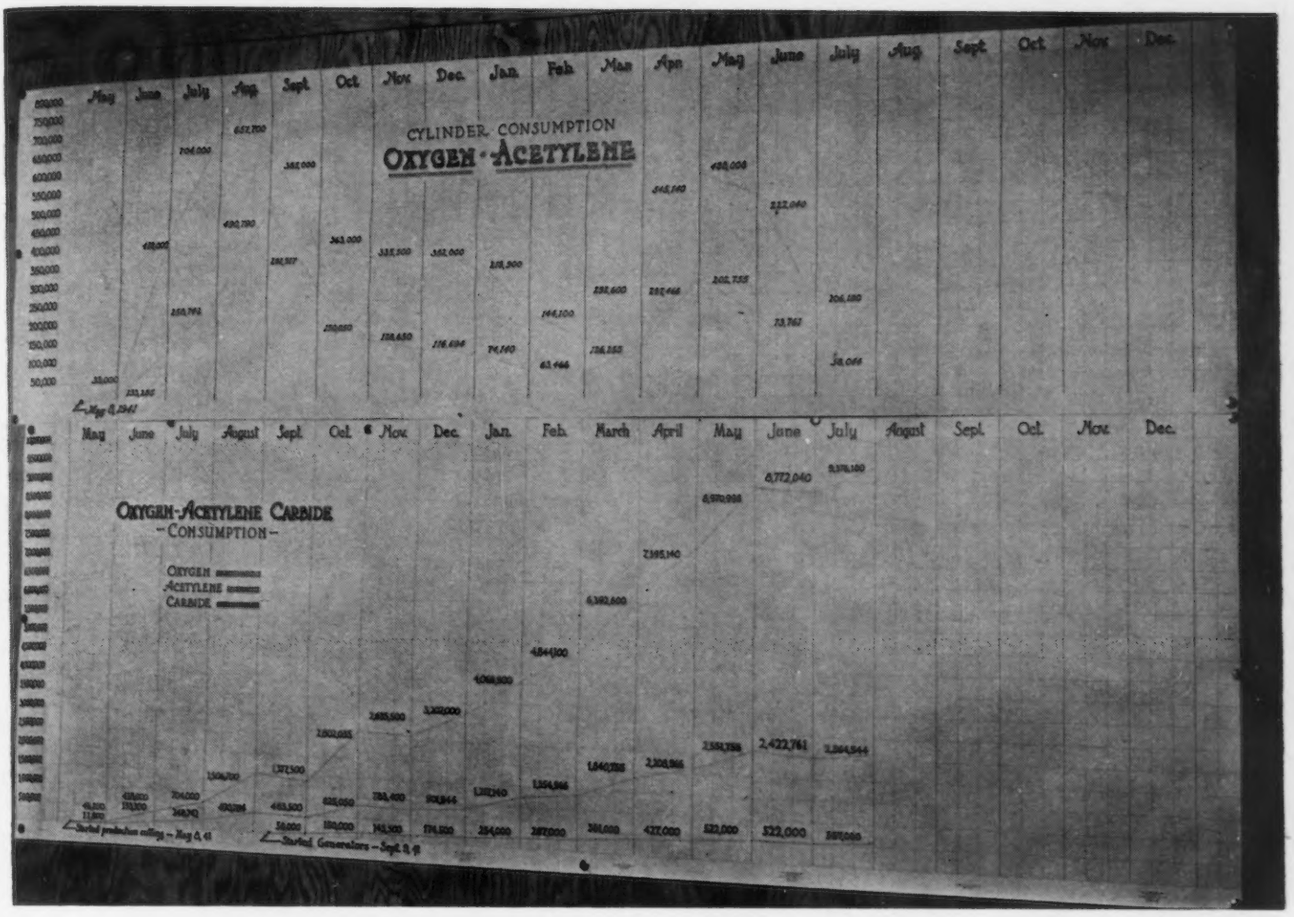
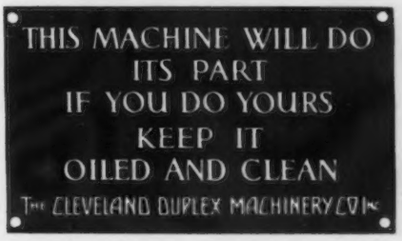

CYLINDER CONSUMPTION
OXYGEN - ACETYLENE
May June July Aug. Sept. Oct. Nov. Dec. Jan. Feb. Mar. Apr. May June July Aug. Sept. Oct. Nov. Dec.
OXYGEN-ACETYLENE CARBIDE
- CONSUMPTION -
OXYGEN
ACETYLENE
CARBIDE
May June July August Sept. Oct. Nov. Dec. Jan. Feb. March April May June July August Sept. Oct. Nov. Dec.
Started production cutting - May 0, 41
Started Generators - Sept. 8, 41

FIG. 8—Monthly consumption figures are kept for oxygen, acetylene and carbide. Upper chart shows cylinder consumption; lower chart shows pipeline consumption. In the latter case, gases are distributed by pipe from a central point. Big cylinders on trailer trucks are "parked" at the distributing stations.

pipeline and cylinder supply, together with carbide demand. These figures provide a ready means of comparing the relationship between gases supplied by the pipeline distributing system and the quantities obtained from cylinders. Also, since the relationship between oxygen and acetylene requirements should remain fairly constant in a particular shop, these records enable monthly checking of this balance.

One of the main essentials of such apparatus inspection, maintenance and control systems is that, once installed, they should be adhered to, and not allowed to lapse. Accordingly the program should be simple enough to be maintained without excessive expenditure of time. That the foregoing systems satisfy this requirement is quite evident. More important, of course, is the fact that these systems are extremely effective in keeping oxyacetylene welding and cutting apparatus in peak operating condition, with the two-fold result that their useful life is extended and their productivity during that life is maintained at a high level.

GETTING workers to take proper care of their machines is being facilitated by this handy nameplate which is being supplied by the Cleveland Duplex Machinery Co., Inc. Many plants were finding, particularly on the night shifts, that workers were neglecting to oil their machines regularly and often left the machines littered with chips when the day shift man took over. The tag is a reminder to clean up for the other fellow.



. . Coated Abrasive Gadgets

CONVERSION to war work finds many industrial plants manufacturing products entirely different from anything they had ever made before, and consequently employing many machines, tools and supplies that had never been important in their previous production. Notable among the products to find new uses are coated abrasives, particularly in the aircraft industry. To meet these new and varied demands for abrasives to speed up difficult little finishing jobs, the Behr-Manning Corp., of Troy, N. Y., has developed and perfected many "gadgets" made of Metalite cloth to be fitted to portable power tools or drill presses.

A tool that has made a definite place for itself in industry is the Spiraband which may be mounted on a high speed flexible shaft or portable air or electric tool. This consists of abrasive cloth with a plain cloth interlining wound on an expanding rubber drum. The Spiraband is firmly held by tightening a nut which expands the rubber core by pressing it together from both ends. The shafts or spindles range from ⅛ to ¼ in. and accommodate Spirabands from ¼ to 3 in. in diameter. The width or face dimensions range from ½ to 9 in. Such a tool can be used for finishing drawing or forming dies used in the manufacture of metal parts for airplanes; rounding off edges and finishing concave areas where radii are short; removing tool marks from and polishing recesses in aircraft engines, such as intake or exhaust chambers of engine bodies, as well as miscellaneous burring operations that are hard to get at with other tools. Fig. 1 shows a small Spiraband wheel in use.

FIG. 1—A small Spiraband tool being used to trim the edges of a slot in a casting.

Of the same construction as the Spiraband, but larger in size is the Spirabelt, Fig. 2, consisting of three pieces—a rubber core, supported by a steel interliner, and two 3/16 in. steel side plates turned down to fit exactly the ground-in side of the rubber core. When the assembly is mounted on a shaft, the plates lock themselves into place so that the sides are flush without a projection at any point. In operation, the steel interliner prevents the rubber core from flaring out, resulting in greater sanding precision. Widths range from ½ to 2 in. Where other types of expanding wheels may be operated safely at moderate speeds only, this wheel will operate smoothly and efficiently at 6000 r.p.m. or more.

FIG. 2—The Spirabelt is a cloth backed abrasive belt mounted on a rubber ring which is expanded against the belt by means of two steel disks. This type of wheel can be operated at speeds up to 5500 ft. per min.

To make easier many intricate polishing operations, Spirapoints are excellent supplementary tools to mounted points, since they will remove any chatter marks left by the harder surface of the mounted wheels or points. This "gadget" consists of strips of abrasive cloth spirally wound in a variety of shapes and sizes in standard grit numbers, Fig. 3, particularly adaptable to finishing and polishing concave areas and for getting into odd shaped orifices. Their ability to break down automatically renews their cutting faces and their cone shape offers a good cutting angle. Fig. 4 shows a typical application.

FIG. 3—A group of Spirapoints. These are small abrasive cloth gadgets prepared by winding narrow strip in the form of a spiral.

Long narrow strips of abrasive cloth spirally wound to the form of a cord have been found useful in smoothing out rough corners on holes which have been drilled. Drawn taut and in position for use, Fig. 5, it takes the form of round abrasive cord and shapes itself to the job being done.

Spiracords may also be wound on a pencil mandrel and used to polish the walls of deep holes, Fig. 6. An eye or slot is cut in the end of the mandrel to receive the abrasive strip. An excellent tool for burring and

Speed Finishing Operations

polishing small holes may be made by threading a small strip of abrasive cloth through a spindle which has an eye similar to a darning needle, Fig. 7. When the spindle is rotated at a speed of 15,000 to 20,000 r.p.m. centrifugal force will keep the abrasive strip extended until it is forced into the hole, causing it to fold on itself. After it has passed through the hole it will flare out, so that when it is pulled out of the hole it will perform the same burring action on both edges of the hole. Should it be required that polishing be done parallel to the axis instead of at right angles to it, this can be done with an oscillating machine. In such cases, the mandrel must have two eyes or slots, so spaced that both ends of the cord may be secured after being tightly wound around it.

For burring larger holes, abrasive disks should be used, mounted on small portable air or electric grinders or on the shaft of a bench-mounted motor. These slotted disks, Fig. 8, are cut to fold like an umbrella when forced into a hole at high speed and assume their original shape as they emerge. Thus if two of these disks are mounted back to back, and passed completely through a hole and back again, they will burr and put a radius on both edges of the opening and polish the inside in one operation. For work on a blind hole, a single disk is mounted on the mandrel, grit side toward the work. Straight slotted disks are available with an o.d. of ⅝ to 1¼ in. for holes from ½ to ⅞ in. For larger holes from 1⅞ to 4 in. proportionally larger disks are available. Selection of grits depends upon the kind of metal and the finish required.

. . . Today under wartime production conditions finishing operations on small metal parts have been multiplied by thousands. The desire for speed and efficiency in performing these operations has brought about the development of many gadgets made of coated abrasive cloth, some of which are described herein.

° ° °

The mushroom sanding pad, Fig. 9, consists of a flexible rubber disk mounted on a steel spindle which goes into the chuck head of a driving shaft. Molded Metalite abrasive disks 3 in. in diameter are attached to this pad with a special pressure-sensitive cement, one application of which is sufficient for the mounting of several disks. The design and flexibility of these pads make them ideal for shaping, grinding and polishing low areas

° ° °

RIGHT

FIG. 5—The edges of small holes can be burred by pulling spirally wound narrow abrasive cord back and forth through the hole.

° ° °

BELOW

FIG. 6—Where the wall of a deep hole is to be polished, a thin strip of abrasive cloth can be wound spirally on a mandrel which is chucked in a portable air or electric tool.

FIG. 4—Application of a Spirapoint abrasive wheel to the channel of an aircraft engine connecting rod.

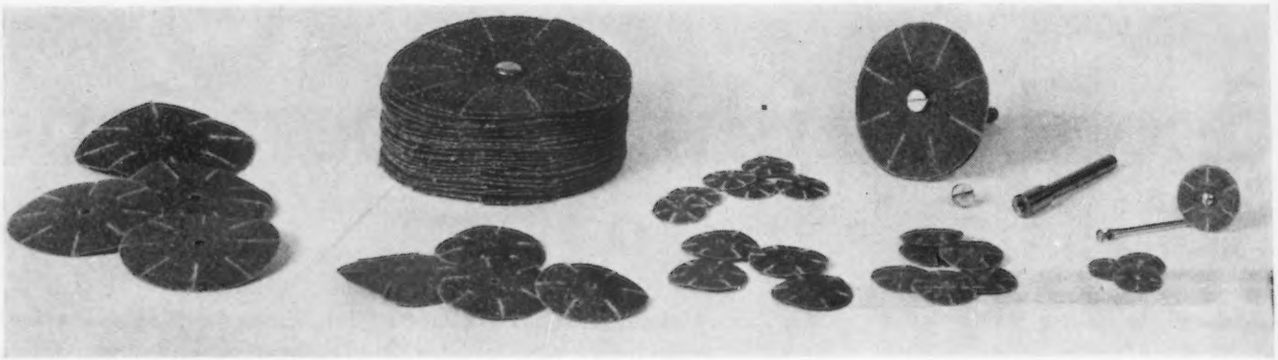


FIG. 7—Small diameter holes can be burred by threading a small slip of coated abrasive through the eye of a needle. The needle is pushed in and out of the hole and the burring action takes place when centrifugal force flings the cloth end outward.

o o o

ABOVE

FIG. 8—Holes from ½ up to 5 in. in diameter can be burred around the edges with slotted abrasive disks such as those shown. The disks fold like an umbrella when forced into the hole at high speed.

o o o

FIG. 9—For finishing flat surfaces it is sometimes convenient to use a rubber mushroom pad with a molded abrasive disk on the face.

ABOVE

FIG. 11—These slotted pencils for use on threaded mandrels are made by winding abrasive cloth upon itself, using glue and an adhesive. As the wheel breaks down, fresh abrasive material is exposed underneath.

o o o

LEFT

FIG. 10—Small abrasive pencils may be made up by winding a strip of abrasive cloth around the end of a slotted mandrel. The loose end is fastened with a piece of masking tape.

such as in drawing-die work or burring and polishing edges and finishing convex or flat surfaces. A rotative speed of 5000 r.p.m. is considered best in operation, with a recommended maximum speed of 6000 r.p.m.

Another type of gadget is pencil mandrels, the most common type of which is the open-end, slotted-rod type, in which the end of a strip of abrasive cloth is placed in the slot in a mandrel, Fig. 10, and is wound in the direction opposite to that in which the mandrel rotates. For exterior grinding and polishing operations, the outer layer of the wound pencil is fastened down with a small piece of masking tape. This keeps the pencil tightly wound and when the outside abrasive area is worn, that part may be torn off and a completely new abrasive area exposed. The end of this roll makes an efficient grinding point which easily adapts itself to various radii. For work on the interior of shafts and the bottoms of closed-end tubes, it is unnecessary to tape the pencil. When running loose, centrifugal force will cause the outer surface to flare out against the cylinder wall.

Pre-formed rolls or cartridges of abrasive cloth, either solidly glued or half glued, may be obtained in any given o.d., width or length and any hole size. These are used with a tapered threaded mandrel which usually has a pilot or reinforcing rod, Fig. 11. This is inserted in the inner hole of the roll which is then turned up onto the tapered thread and the roll of cartridge is used as above.

Standard Bending Roll Used to Salvage Electric Cable

UNTIL recently it has been general practice to burn the rubber and cloth insulation off scrap electric cables to salvage the copper. Timken Roller Bearing Co., seeking a method of salvaging cable rubber, experimented with a standard Buffalo bending roll machine, which ordinarily carries three smooth bending wheels, two of which are in tandem beneath the movable upper wheel. Varying pressures are exerted upon the material to be bent by raising or lowering the upper wheel.

Timken engineers removed one lower wheel and replaced it with a notched gripper wheel, Fig. 1. A sharp center-flanged wheel, Fig. 2, replaced the upper wheel. No change was made in the third wheel. This conversion, which only takes a few minutes, has proved extremely effective in removing the outer layer of cable cloth insulation and the inner layer of fine rubber, which is so urgently needed at the present time. The gripper wheel feeds the cable between the flanged cutter wheel and the pressure wheel, slicing the cable open and peeling it simultaneously. The cloth cable cover drops away from the rubber, Fig. 3, leaving the rubber and copper cable in a salable condition without further attention.

Cable rubber salvaging is accomplished at the rate of about 6 ft. per min. Cables ranging in size from ⅝ to 2 in. are easily handled.

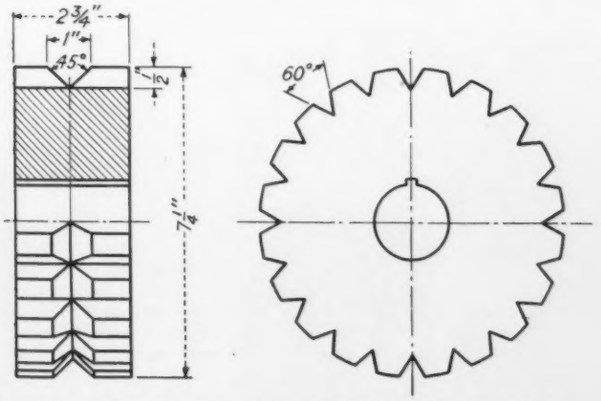


FIG. 1—The gripper wheel has a 45 deg. groove around the circumference to guide the cable while the 20 equally spaced 60 deg. V-slots across the face grip it.

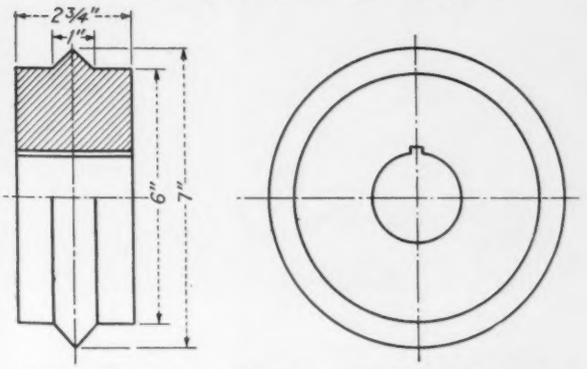


FIG. 2—The cutter wheel has a raised 45 deg. central flange for cutting the cable casing. Both the cutter wheel and the gripper wheel are made from Timken Graph-Mo steel, oil quenched.

FIG. 3—Standard Buffalo bending roller used for stripping copper cable at the plant of the Timken Roller Bearing Co.

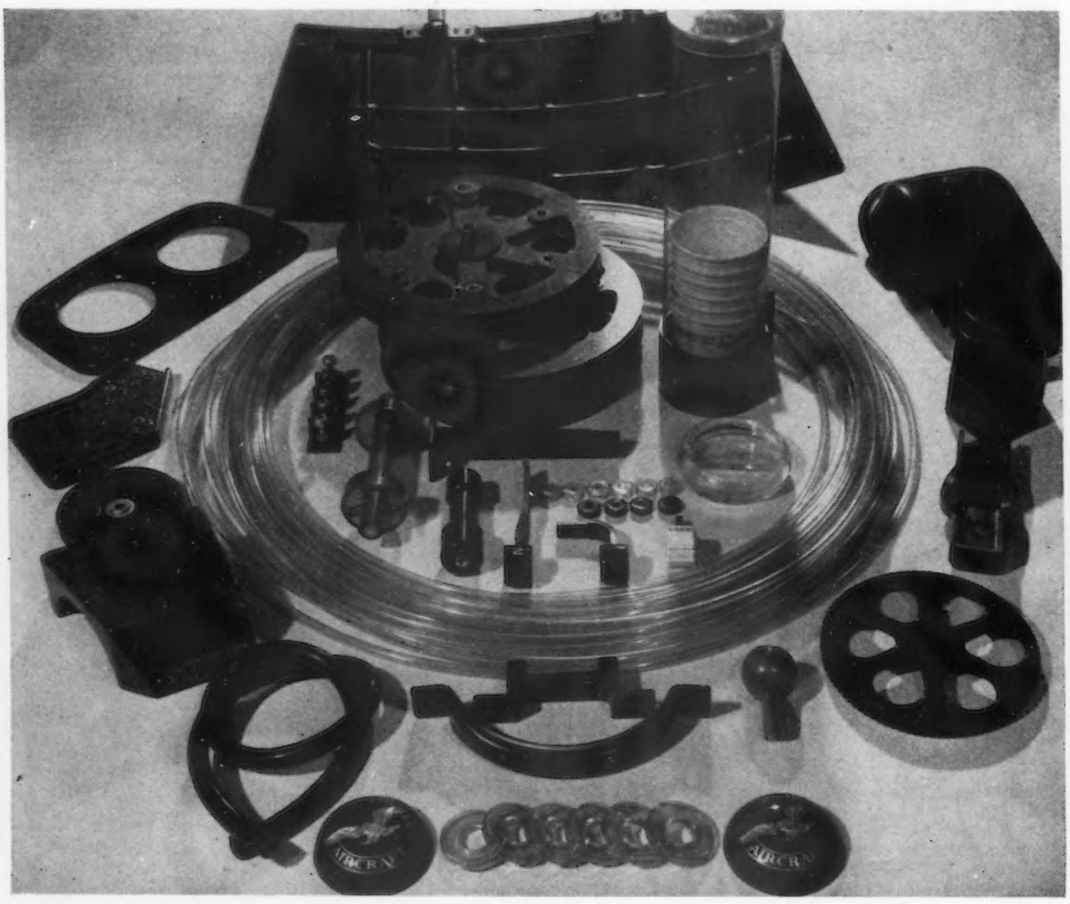
. . . Plasticized Wood for

TWO and a half years of research in plasticized wood has proved that it can be used to replace valuable aluminum alloys on the Consolidated B-24 Liberator, the new C-87 cargo landplane, and on another product now being built and projected. It has also been shown that there are limits to the use of this material in such craft. For instance, a Liberator made of plasticized wood is out of the question due to the stresses imposed on the structure at the high cruising speed at which the plane operates and due to the load factors which are developed in combat maneuvers.

At present, with plasticized wood parts on the Liberator numbering 22, 204.79 lb. of aluminum alloys are saved, and this is just the beginning. The replacement installations which have been tested and proved include all trimming tabs; guards for push-pull control rods and control cables; side gunner and life raft cradle doors, and the escape hatch in the pilots' compartment. Wing tips, 35 in. wide and 53 in. long, have not yet been installed, but experimentation with them is now going on.

Projected are nose wheel doors, pilot and crew seats and wheel well domes. In connection with the latter it is interesting to note that not only are experiments being made with plasticized wood but laminated cloth using a resin filler are also being tested. As fast as research and tests prove that wood can replace metal at any other points, the installations will be made. The engineering work on this project is being done by Kenneth W. Woodson, plastic engineer and consultant.

There are several reasons why the company has concentrated on the development of plasticized wood. The first and most important, of course, is the saving of valuable alloys. In mass production, a saving of a few hundred pounds per ship soon runs into tonnage. Second, it has been found that in most cases where plasticized wood is used there is a considerable saving in weight. This saving may run as high as 40 per cent,



o o o

SOME of the 1445 parts of molded thermo-setting and thermo - plastics which are used in the B-24 Liberator. Among the articles seen here are aileron quadrants, saving 3 lb. in weight; a cup container which costs $1.05 in plastics against $4 in metal; grommets for electrical application; vinyl tubing for battery drains and insulation; trim taby control wheel of thermoplastic; control knobs, an antenna mast; thermos jug drain tray, and a small instrument panel.

o o o

Aircraft Parts

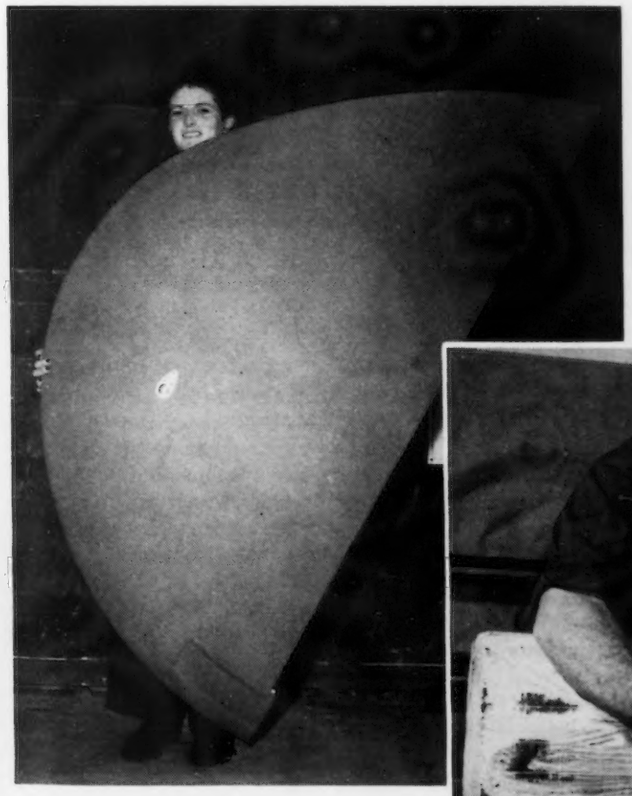
By FRANK W. FINK
Chief Production Engineer, Consolidated Aircraft Corp., Las Vegas, Cal.

. . . The use of plasticized wood parts for the Consolidated B-24 Liberator has saved about 205 lb. of precious aluminum alloys. Although the Liberator is too fast a plane for an all-wood construction, experiments are now being carried out on the possibility of building plasticized wood craft. Present practice, however, is mainly devoted to the replacement of metal parts with plasticized wood.

even in such primary structures as trimming tabs. The average saving is 15 per cent. However, in highly stressed primary structures the wing tips are an example—the difference between metal and wood, as far as weight is concerned, is negligible. Elevator tabs offer an extreme example of weight saving. The metal tab weighs 0.98 lb. while the plasticized wood tab weighs only 0.59 lb.

While no weight is saved in the wing tip, the plasticized wood has advantages which become apparent in manufacture and in operation. In fabrication, the metal wing tip demands the use of blind rivets. The wood wing tip does not. In the event of wing tip damage in the field, proper repair calls for the use of a shop and skilled metal workers. Damage to the wood wing tips can be repaired by any carpenter.

Another example of weight saving is found in the side gunners' doors. Made of metal, these doors weigh 13.05 lb., while the plastic wood installations weigh only 11.22 lb. Similar savings in plane weight can be



LEFT

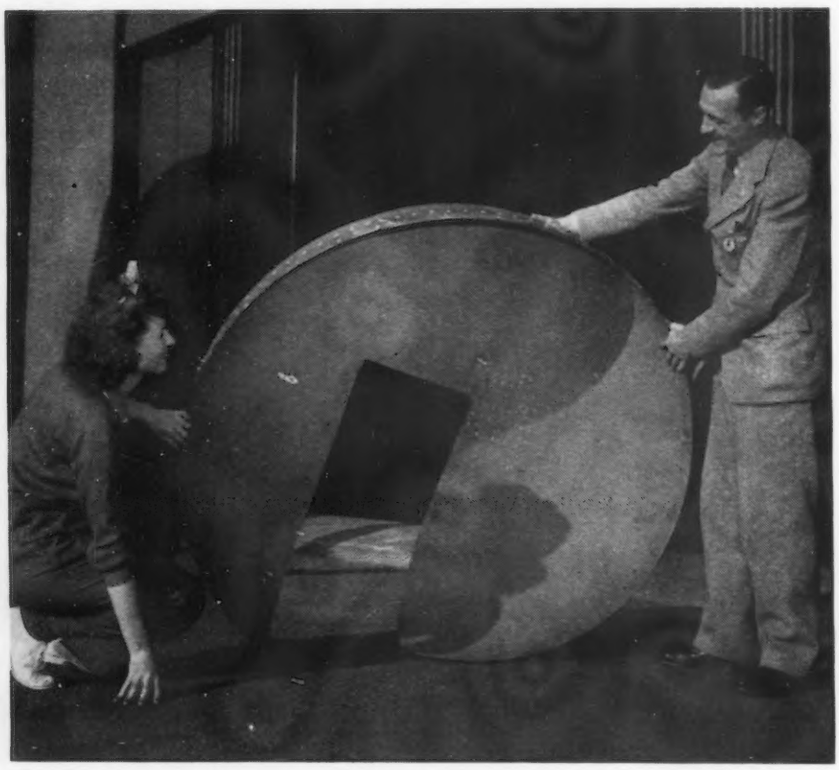
WING tip of phenolic laminated paper has been designed to replace strategic metals at less cost of fabrication and with lighter weight. The wing tip, 39 in. by 58 in. is designed to be installed on a Consolidated Liberator.

BELOW

LAMINATED cable guard with compound curve is constructed by laying thin strips of veneer over a form and baked. After a small amount of trimming, it is ready for use.

reported all down the line, which means that this poundage can be utilized for greater gas and bomb loads.

Cost is another factor to be considered. While some wood parts cost as much to fabricate as do like metal parts, the overall saving on installations in the Liberator average about 15 per cent. The cost should be lowered somewhat farther as production increases.



WHEEL well fairing of laminated plywood weighs 13 lb. It can be constructed more cheaply than the metal job, which weighs 30 lb.

Another advantage which cannot be overlooked is that the wood parts lend themselves to subcontracting thus saving much needed floor space.

In addition to conducting research and tests on the Consolidated B-24 Liberator, the same replacement policy on the new C-87 cargo plane is being followed. It has also been found that there are 30 parts on the PB2Y3, the four-engined flying boat, that can be replaced.

Quantity production of plasticized wood parts is not attempted. As soon as a part has been proved it is turned over to a subcontractor for mass production. This leaves the company oven free for development work.

Baking Under Steam Pressure

Baking takes place under a steam pressure of 75 lb. per sq. in. This gives a heat of 320 deg. F. Parts are baked 15 min. to half an hour, the length of baking being proportional to the thickness of the part. As an example, plywood baked to one-half in. thickness would require a baking period of one and one-half hours. The use of pressure and heat produces an exceptionally fine product, as the resin is forced through the wood, into capillaries and fibers. Tests on the product show that it has more dimensional stability, is more waterproof and has far better compression and sheer resistance than plywood which has simply been sealed under heat through the use of resinous glue.

One of the present problems is the wood from which is being used. Not only are these forms costly to make but they do not stand up under use. Experimental work is being done on poured plastic forms. These are fabricated by mixing resin with wood flour or walnut shell flour, baking at 170 deg., and curing. It is believed that such forms not only can be fabricated more quickly and cheaply, but that they will not depreciate as rapidly as the wood block forms which are now being used.

Extremely good luck has been experienced in riveting the plasticized wood. One method, used in the trimming tabs, is to bake cloth over the wood. This permits riveting without cracking. Another is the use of a washer under the head of the rivet. The washer is about three times the diameter of the rivet.

As fabrication improves, there is a definite possibility of building plasticized wood cargo planes. These would not have to stand the load factors imposed on such craft as the Liberator, which is made entirely of plasticized wood, would weigh as much or more than the metal plane. Plasticized wood is already being used, of course, with marked success in the construction of gliders, training planes and other equipment which is not subjected to extreme loads.

The company not only is experimenting with plasticized wood, but at present has developed more than 300 molded plastic parts for the Liberator. The work in molded plastics is also being supervised by Woodson, and is conducted as a unit in conjunction with plasticized wood research. Efforts are being directed to the saving of metals and to cheapness and lightness. There are so many types of molded plastics that a complete discussion of them in a brief space is impossible.

One example of money-saving, however, lies in a cup dispenser. A plastic cup dispenser was 80 per cent cheaper to construct than the metal dispenser. As to weight saving, an aileron quadrant which would have to take a 1100 lb. static load could be made of macerated canvas. It would be 3½ lb. lighter than the metal part then used. Tests were run on the completed molded plastic part, and it was found that it carried 160 per cent of normal load without a sign of failure.

Another part which has been produced in plastics is the throttle quadrant. The material thickness was increased from 0.091 in. to ⅛ in. as the change was made from metal. Other design alternations were negligible.

The use of molded plastics for nonstructural parts such as control knobs, fairleads, and brackets, does not save much weight. This is due to the fact that generally molded plastics are double the thickness of the metal they replace, so that approximately the same strength ratio is obtained. One problem in molded plastics is the extreme cold encountered at high altitudes. Many molded plastics have a tendency to brittleness and to subsequent failure. This calls for a cold test to be run on every molded plastic part.

A.I.M.E.

The mining and metallurgical engineers at their annual meeting put the spotlight on boron and heard papers on total operations in steelmaking, new steel research methods, and advances in aluminum power metallurgy.

WITH the largest attendance in its history, the American Institute of Mining and Metallurgical Engineers met last week in New York. Twenty-five hundred members attended a four-day program, Feb. 15 to 18, of technical papers and discussions, many of them on war-spurred research.

At the annual dinner of the Institute on Tuesday, which was attended by 1,000 members, the principal address was given by William M. Jeffers, national rubber director. Mr. Jeffers predicted a new era of transportation, with developments largely dictated by competition. Along with the competition, however, he said, will be a new realization of the dependence of the various forms of transportation on one another.

Former President Herbert Hoover, whose speech was unscheduled, deprecated the training of engineers in 15 months, suggesting that when the war is over those who have taken the 15-month courses return to the universities and get the real engineering education they will need.

At the Institute of Metals division dinner on Wednesday evening, Dr. Joseph W. Barker, special assistant to the Secretary of the Navy, drew attention to the large staffs of instructors assembled with good teaching aids, laboratories and living accommodations for training civilians for war, and suggested that after the war the process be reversed with the Army and Navy retraining these men to take their places in civilian life. A start in this direction has already been made, he said, through the establishment at Madison, Wis., of a joint Army-Navy education center known as the Armed Forces Institute.

"What so few of us remember and what we should know," said Dr. Barker, "as a result of the tragic period this nation and the whole world is undergoing, is that security and peace and freedom from want can never be achieved until collective thinking and planning is applied to the problem. Mentalities such as those of the National Socialists and the Tokyo militarists must be hemmed in and destroyed. Only when that is done will men and women of your high caliber and of your professional training be able to contribute lastingly and fully to the building of a better world on the ruins of the old."

Harvey N. Davis, director of production research and development for the WPB, and president of Stevens Institute of Technology, speaking on Monday at the All-Institute luncheon, pointed out that sponge iron made from high grade ores and that from low grade ores are different matters. Swedish sponge iron is made from very high grade material, he said, and is used in electric furnaces for cutlery. The United States is making in effect, he said, 64,000,000 tons of sponge iron. When the iron ore, at the top of the furnace is reduced to metallic iron by coke, he said, it is the same as sponge iron. The only difference is that if left alone, a good deal of the silicon and other impurities burn out, it becomes molten, and it is pig iron.

From the point of view of helping to save small industries, he expressed himself as favorable to utilization of brick kilns and rotary cement kilns to make sponge iron, to keep the brick and cement industries going. The estimated production of such sponge iron would be very small, he said, perhaps around 500,000 to 1,000,000 tons. It might be produced, he said, without any great change in the kilns. The Bureau of Mines is experimenting on such production and has two cement and two brick kilns working with sponge iron at present, he reported.

C. H. Mathewson, professor of metallurgy, Yale University, was installed as 1943 president of the Institute. Herbert W. Graham, director of metallurgy and research, Jones & Laughlin Steel Co., Pittsburgh, took over the chairmanship of the Iron and Steel division for the coming year, at the division's luncheon on Thursday, and Cyril Stanley Smith became chairman of the Institute of Metals division at that division's dinner on Wednesday.

Among the important events of the meeting was the presentation of the Robert W. Hunt gold medal, the seventh to be conferred in the 24 years since the honor was founded, to Marcus A. Grossmann, director of research, Carnegie-Illinois Steel Corp., Chicago. Dr. Grossmann won the award for his paper "Hardenability Calculated from Chemical Composition," presented in 1942 to the Iron and Steel division. Dr. Grossmann's work was cited as having revised the concept of hardenability and the effect of alloying elements, and having stimulated a large amount of research.

James M. Stapleton, superintendent of the "old side" blast furnaces at the Carnegie-Illinois Steel Corp.'s South Works received the J. E. Johnson, Jr., award for his work on blast furnace filling and distribution. Mr. Stapleton's work was summarized in his paper, "Results Obtained from Surveys of Gas at Furnace Tops," presented in April, 1942, at the Blast Furnace Conference.

The Institute of Metals award, made at the division's dinner on Wednesday, went to J. D. Hanawalt, C. E. Nelson and J. A. Peloubet, all of Dow Chemical Co., for their paper,

"Corrosion Studies of Magnesium and Its Alloys," presented in October, 1941, at the Philadelphia meeting of the Metals Division. The research summarized in this paper resulted in the production of magnesium alloys on a commercial scale that are 10 to 100 times as resistant to salt water as the previously used alloys.

This year's Howe Memorial lecture was by Leo F. Reinartz, manager of the Middletown Division, American Rolling Mill Co., whose subject was research and quality control in steel

C. H. MATHEWSON, Professor of Metallurgy, Yale University, new president of the AIME.

Boron—How to Find It, What It Does

ONE of the liveliest sessions of the convention was the panel discussion on boron in steel, held by the Iron and Steel division on Wednesday afternoon, with R. S. Archer, Republic Steel Corp., and M. A. Grossmann, Carnegie-Illinois Steel Corp., as chairmen. What has been planned as a round table session overflowed into a packed meeting, attended by several hundred members.

In discussing spectroscopic analysis for boron, J. L. Gregg, Bethlehem Steel Co., said that the spark method, while more accurate than the a.c. arc method, will not detect such small quantities of an element as boron content in steel. Using the a.c. arc method, he said, with 5 amp. through the sample, an analysis can be made in 15 min. Mr. Gregg said that Bethlehem, in cooperation with the Bureau of Standards, has in preparation samples containing 0.0005 to 0.008 per cent boron, which will be used in calibration. Present samples run from 0.059 to 0.007 per cent boron content.

George T. Motok, Republic Steel Corp., pointed out that only three boron lines are available for spectroscopic determination of boron in steel. These are 2451 A°, 2496.78 A° which is close to an iron line of 2496.54 A°, and 2497.73 A° which is close to another iron line of 2495.7 A°. For low concentrations, he said, the 2497.73 A° line is used. Since this is superimposed on a weak iron line, a boron free sample must be used in conjunction with the boron steel sample, and allowance made. Mr. Motok said the work he described had been done most successfully with a 5/32-in. sample, dome shaped at the end, made by sucking steel with a ball into glass tubing 5/32 in. in diameter.

Jerome Strauss, Vanadium Corp. of America, said that the problem of analysis is distinctly different if the boron is added as part of a complex alloy rather than as a separate alloy. He said that methods capable of testing the difference between 0.002 and 0.003 per cent boron may not be useful for percentages a tenth as large. It was his opinion that tests for the more minute amounts can be made only by examination of mechanical properties under certain methods of thermal treatment.

The effect of boron on austenitic grain size was touched on briefly by George Comstock, Titanium Alloy Mfg. Co., who confirmed his remarks to the observation that boron somewhat coarsens grain size. This subject was again touched on in the discussion following presentation of the papers, when Norman F. Tisdale, Molybdenum Corp. of America, said that work on ingots from 18-lb. to 40,000-lb. sizes showed this coarsening effect to be consistent. With large or small ingots, and starting with small or large grains, this consistent coarsening held true, he said, mentioning that in the 40,000-lb. size the normal grain size of 3 becomes, with boron, 2.

J. B. Austin, United States Steel Research Laboratories, pointed out that boron is approximately equal to aluminum in deoxidizing ability, and drew attention to the fact that in ingots there will be a fading of boron unless it is protected by a deoxidizing agent, such as aluminum, calcium, etc.

In the next subject discussed, the effect of boron on structure, most of the remarks were off the record. However, in a later discussion, A. J. Hertzig, Climax Molybdenum Corp., took up the question of how dilute is 0.002 per cent boron in austenite. Ten thousand atoms of steel, he said, would be 2,500 unit cells of austenite, or a cubic block measuring about 14 units. In such a block 9,765 atoms would be iron and one would be boron, a circumstance which does not permit analysis of the effect of boron. He suggested, for analysis of the effect, a study of the rate of nucleation and the rate of growth. Such a study, he said, would tell whether boron affects the rate of growth and acts as a true alloy, or whether it acts as an inoculation affecting nucleation.

In response to this is was cited that an examination of nucleation and the rate of growth had shown that nucleation is tremendously affected, the rate of growth slightly. He characterized the nucleation phenomenon as 95 per cent of the effect.

Continuing on the same subject, Dr. Grossmann pointed out that in hypereutectic steels of 0.10 to 1.35 per cent carbon, when quenched at ordinary temperatures, boron is not effective. Undissolved carbides are present, he said, as nuclei and may mash the nucleation effect. Mr. Archer then remarked that undissolved carbides have more effect on nucleation than does aluminum, for example. It was also pointed out that the form of boron in its insoluble residue is still unknown. It was reported, however, that it is definitely known not to be boron nitride or boron carbide.

Discussing fading effects, Dr. Strauss said there were none if the boron is added in adequate quantities. If it is added as a complex alloy, he said, there is very little difficulty with overdoses, since as little as 0.0006 per cent is effective, and an overdose does not get into dangerous ranges. Mr. Tisdale, on the same subject, said the reasons for fading were that boron was not properly protected because it was added when the silicon and aluminum were added. He proposed that the boron be added after deoxidation, giving as his opinion that there is no necessity of getting boron into steel other than ferroboron, if deoxidation takes place first.

LEO F. REINARTZ, Middletown Division, American Rolling Mill Co., delivered this year's Howe Memorial Lecture.

Dr. Strauss said that boron has been shown always to be effective in steel with up to 5 per cent of alloys. He later amplified this by saying it did not follow that boron is ineffective in higher alloy steels, but rather that the studies had been confined to steel of 5 per cent alloy or less. There is a very significant effect, he said, even on 5 per cent nickel steel.

F. B. Foley, Midvale Co., said that higher drawing temperatures applied on carbon steels lessen the effect of boron. At 1100 or 1200 deg. F. treatment, he said, the effect practically disappears. At high orders of hardness, over 400 Brinell, ductility increased, he said. He expressed the opinion that, for practical purposes, a report on the effect of the boron in a particular steel is more important than a report that some certain amount of boron is present.

In a discussion of the question whether it is true the effect of boron lessens as drawing temperature increases, it was remarked that there is always some significant effect on ductility, sometimes small but always there. Mr. Foley remarked that it was odd that intergranular precipitation of boron should make ductility higher rather than lower, and Mr. Strauss said that in the annealed condition it is sometimes lower. It was said that too much boron makes a low melting point intergranular eutectic, and it was remarked that in some cases where steel had shattered in rolling there appeared to be intergranular liquid. It was also said that in certain steels it is possible that boron will give a better quench, which will add in ductility, and that a distinction must be made between that type of improvement and one in annealing.

Sintering Practice for Open Hearth Ores

IN surveying the vast increase in present steel reliability over that of 25 years ago, Mr. Reinartz emphasized that such improvement is accomplished only by getting all the facts, keeping accurate records, analyzing them and checking against previous set standards of procedure for every process involved in the making, shaping and treating of open hearth steel.

Discussing control of ore charged heats, he said, "Great care must be taken to have dry ore charged on the bottom of the hearth. Now many plants must use at least 50 per cent of the charge ore as fine ore which is often high in combined moisture and high in silica. At Carnegie-Illinois plants, the ores have been nodulized in cement clinker kilns. In a number of other plants, the ores are sintered in blast furnace sintering plants.

"Open hearth sintered ore must be more lumpy and dense than blast furnace sinter. We having found that higher temperatures and the additions of borings or turnings in quantities up to 15 per cent of the total sinter charge will help solve this problem.

"We have for years briquetted soft ore in a jarring machine by the use of 2 per cent or less of cement as a binder. We then burn these briquettes for 20 to 30 min. in the open hearth furnace at the time of charging to remove the combined moisture. This practice helps from a safety standpoint but is erratic and causes some decrease in tons per hr.

"We have recently built a briquetting machine similar to a concrete cinder block machine and a continuous drying furnace is being constructed so that the moisture in the resulting 35 to 50-lb. briquettes will be less than 2 per cent. Tests have indicated that this briquetting ore is very satisfactory particularly for feed ore, and fills a vital need in quality control for the present type of high hot metal open hearth charges."

Mr. Reinartz gave the mixture of materials from which open hearth sintered ore is made, as follows:

	per cent
Flue dust	39
Iron ore	49
Mill scale	6
Cast iron borings	5
Extra coke	1

"In order to standardize hot metal," Mr. Reinartz said, "in one of our plants the hot metal is being treated by the proportionate and regular addition of rolling mill scale to the molten metal, at the open hearth departments as it flows from two 175 net ton ladle cars into the open hearth transfer ladle. By this method, the volume of acid slag resulting from the oxidation of silicon and manganese can be removed easily from the top of the transfer ladle. This process delivers hot metal of uniform silicon analysis, say 0.40 to 0.70 per cent, to the open hearth furnaces and therefore helps standardize this variable."

The analysis of the resulting slag skimmed from the top of the treated metal, which represents about 2 per cent of the total weight of the iron, is, Mr. Reinartz said:

	per cent
SiO_2	39.5
MnO	23.6
Sulphur	0.12
Phosphorus	0.012

Total Operation Approach to Steel Problems

ATTENTION was drawn by W. C. Marshall and F. G. Norris, Wheeling Steel Corp., to a class of steel making problems that cannot be solved in either the blast furnace or open hearth departments alone, but must be considered as joint problems of both departments. In a paper called "Problems of Total Operation in Steelmaking," presented at the Iron and Steel Division's Thursday afternoon session, the authors used this integrated process approach, as a departure from a customary unit operation approach, to investigate the phosphorus cycle within a plant, and the factors of open hearth production.

In a plant using open hearth slag in the blast furnace, both operations contribute to the total effect on the iron analysis, the authors point out. If high-manganese iron is to be made, open-hearth slag as a source of manganese is usually cheaper than manganiferous ores. Ordinarily the problem could be decided on the comparative cost of various sources of manganese within the limitations of the phosphorus tolerance specification. At present, however, the question of manganese conservation must also be considered. It must be decided not how much manganese can be recovered from open-hearth slag but rather how little manganese must be thrown on the dump as open-hearth slag, the authors say.

The slag analysis and percentage of open-hearth slag in the burden furnish a description of the phosphorus problem, which is incomplete because it considers one blast furnace as a unit. The viewpoint of the total operation considers all of the open-hearth furnaces receiving iron from them as one unit. A phosphorus balance can be worked out for this large unit in much the same way that a burden sheet is made for one furnace. It is recognized in the operation of one furnace that a change does not have an immediate effect but takes a little time to come through. This same time effect is found in the phosphorus cycle of the plant with the advantage of additional information because samples can be taken at various stages during the change.

Phosphorus build-up in the iron is not continuous, but levels off at a constant value, so that the weight of phosphorus leaving the cycle is equal to the weight of phosphorus entering the cycle, the authors find.

In investigating open-hearth production, the authors find the average daily production of steel to be dependent on the number of open-hearth furnaces in operation, the weight of hot metal delivered to the open hearth, the percentage of hot metal in the open-hearth charge, and the quality of the scrap as expressed by the average weight per box. The relative importance of each of these factors is expressed by a regression equation (Table 1).

The direct effect of blast-furnace operation on open-hearth production is perhaps not always realized. This regression equation shows that aside from putting another furnace into operation, the most effective way to increase open-hearth production is to increase blast-furnace production.

It may seem paradoxical that the percentage of hot metal has a negative coefficient. This, of course, is not true with respect to an individual heat because in this treatment of the problem it is assumed (often without realizing it) that there is an unlimited supply of hot metal available. The problem from the standpoint of total operation is not what percentage of hot metal to use in one furnace to make the best heat time but rather how best to proportion the charge, including charge ore, so as to make the best production. In other words, as large an amount as possible of metal should be as small a percentage as possible of the total daily charge.

Sometimes the statement is considered that with so many charging delays it would be just as well to take off one furnace so that those remaining in operation could make better time. However, for a given weight and percentage of hot metal the best 9-furnace operation can never equal the production of the poorest 10-furnace operation. In taking off furnaces, the percentage of hot metal would probably be increased, but would further decrease the open-hearth output.

In times when efficiency of operation rather than total production is the sole objective, regression methods are just as effective, but the action dictated by the results will be very different, the authors conclude.

Aluminum Powder Metallurgy Developments

AMONG the papers presented at the Institute of Metals Session, "Recent Developments in the Formation of Aluminum and Aluminum Alloys by Powder Metallurgy," by G. D. Cremer and J. J. Cordiano, Hardy Metallurgical Co., was particularly interesting.

Aluminum powder has not been employed extensively in powder metallurgy, the authors point out, because of the presence of a refractory film of oxide, a tendency to cold weld to the die walls, the hardness of aluminum alloy powders when compared with elemental aluminum, the susceptibility of some of these powders to age hardening, the fact that even in the annealed condition plastic deformation of alloy powders under pressure is low when compared with unalloyed powders and the fact that the alloy powders have lower corrosion resistance.

The authors' investigations indicate that aluminum powders made by atomization may be employed to produce high-strength pieces by powder metallurgy, despite the presence of oxide films on the particles, provided that die surfaces are treated to eliminate jamming or cold-welding.

Cold-welding, which tends to be very serious in the powder metallurgy of aluminum, may be eliminated by coating the dies with a thin film of flat-lying, overlapping metal flakes.

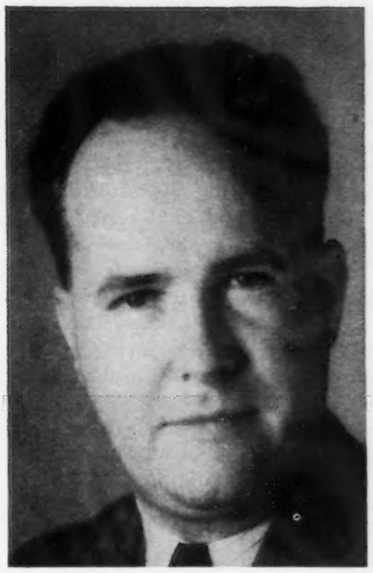
In properly lubricated dies, elemental aluminum parts of high strength can be made satisfactorily. Under proper conditions, strengths at least as high as those encountered in equivalent cast and forged material may be obtained.

Their work shows that in the manufacture of aluminum alloys by powder metallurgy it is desirable to employ a mixture of the alloy ingredients rather than pre-alloyed powder. A number of aluminum alloys have been made by this procedure including aluminum-copper, aluminum-copper-magnesium-manganese and aluminum-copper-magnesium, and the physical properties thereof compare favorably with those of equivalent cast and forged material, although it has not been possible as yet in all instances to equal the properties of cast and forged material. It was found necessary to employ aluminum powder of at least minus 100-mesh in order to obtain adequate mixing of the aluminum powder with the appropriate alloy ingredients.

Aluminum-alloy parts made by powder metallurgy from mixtures of powders of the elements are susceptible to age-hardening and precipitation-hardening treatment although these treatments in general may be different from those employed in the production of cast or forged material.

The authors conducted experimental work on a limited scale with a modified aluminum-alloy composition mixture containing 2.5 per cent copper, 0.5 per cent magnesium, balance aluminum. Various compacting pressures and sintering procedures were employed with encouraging results. Elongations of 20 per cent with tensile strengths on the order of 40,000 lb. per sq. in. were obtained with compacting pressures as low as 30 tons per sq. in., the sintering being conducted in nitrogen at a temperature of 610°C. for 30 min. This par-

J. D. HANAWALT



C. E. NELSON

J. A. PELOUBET

Members of the metallurgy department, Dow Chemical Co., who received the Institute of Metals Division award.

ticular powder mixture holds considable promise, because of its simplicity and particularly because of the low compressive force required.

A technique was developed for the manufacture of small aluminum and aluminum-alloy pieces of high strength and accurate configuration. Further advantages of the new technique reside in the economical use of material, low scrap loss, and relative low cost of operation.

10-Min. Oxygen Analysis of Molten Steel

A NEW method of sampling a molten steel bath for oxygen was described by Gerhard Derge, Carnegie Institute of Technology, in "Rapid Analysis of Oxygen in Molten Iron and Steel," presented on Thursday morning. It consists of a small split copper mold, which gives a wedge-shaped sample. Vacuum-fusion analysis of this sample gives results that indicate that it is as reliable as either the aluminum-killed bomb test or the carbon-oxygen equilibrium for estimating the oxygen in the bath.

This device chills the sample so effectually that it can be removed at once with bare hands, and it remains bright and shiny. Five to 10 grams of sample are cut off the bottom of the wedge for analysis and placed in the previously heated and evacuated vacuum-fusion apparatus, and the evolved gas is collected. The volume of this gas enables the operator to read the amount of oxygen from a chart, which incorporates all necessary corrections. It is estimated that under favorable conditions the percentage of oxygen can be determined within 5 min. of the pouring of the sample; 10 min. is certainly a liberal allowance for the time.

The author believes that probably the most important use of the rapid oxygen determination he proposes would be in determining an oxygen value at the end of a heat, which would establish the deoxidation required for that heat. This should result in improved quality and also in greater ingot yields, especially in semi-killed types. In special cases where extreme cleanliness is important or when the rate of refining must be controlled, the test should have great value. The test should prove useful also in Bessemer, acid open-hearth, and electric steelmaking work.

If the rapid features of the test are dispensed with and interest is centered upon the correct sampling of the steel bath to establish a certain plant practice or as a research tool in investigating other steel-making problems, the wedge test offers many advantages over the bomb test. It is an easier test to make, therefore can be made more frequently and rapidly. It appears to have many advantages over the bomb test in ease of standardization and reliability. It preserves the steel as it is in the bath without superimposing any additional chemical reactions, and it is thus a new tool for studying many steelmaking problems.

Re-examining the aluminum-killed bomb test in the light of results obtained by the vacuum-fusion analysis, the author concludes that under many conditions of testing all the oxygen in the bath is not converted to alumina and the results are consequently in error.

Ionization Study Illuminates Slag Reactions

WHETHER or not slags are ionized, and if so, to what extent was the subject of a paper entitled "The Electrical Conductivity of Molten Blast Furnace Slags," by A. E. Martin, University of Minnesota, and Gerhard Derge, Carnegie Institute of Technology, presented Thursday morning at the meeting of the Iron and Steel Division.

Metallurgists are accustomed to regard reactions in molten slags as involving only neutral molecules. For example, the dissociation of calcium silicate usually is represented as

$$Ca_2SiO_4 = 2CaO + SiO_2$$

although a reasonable alternative would be to write

$$Ca_2SiO_4 = 2Ca^{+2} + SiO_4^{-4}$$

Such ionic dissociation has been suggested frequently without adequate experimental proof.

The authors' investigations have led them to conclude that molten blast-furnace slags have high electrical conductivities and a high positive temperature coefficient of conductivity, which indicate high degrees of ionization.

At a given temperature, electrical conductivity in the CaO-Al_2O_3-SiO_2 system is somewhat related to viscosity; the former increasing, the latter decreasing with increasing basicity. This probably means that in the more basic slags either ionization is higher or the ions are smaller and therefore more mobile.

Silicon migrates with the negatively charged groups during electrolysis; calcium, with the positively charged groups.

A theory of slag constitution based on the results of this research and modern knowledge of glasses assumes that as the atomic ratio of oxygen to silicon in a slag increases the number of small silicate ions of the type $(SiO_4)^{-4}$ and $(Si_2O_7)^{-6}$ will increase, and that constituents such as CaO, FeO and ferrites become stable in basic slags because it is only under these conditions that unsaturated silicate complexes will not tend to attract all available oxygen ions.

JAMES M. STAPLETON, South Works, Carnegie-Illinois Steel Corp., winner of the J. E. Johnson, Jr., award.

Model "Steel" Ingots of Silver Chloride

ANOTHER interesting paper, entitled "Silver Chloride as a Medium for Study of Ingot Structures" by Karl L. Fetters and Margaret Dienes, Carnegie Institute of Technology, was presented on Thursday at the Iron and Steel Division session. The authors, recognizing the cost and time disadvantages in a study of full-sized commercial ingots, the fact that small steel ingots are unsatisfactory for structure study because of too rapid freezing, and the limitations of nonferrous and wax model ingots, have investigated the use of silver chloride, AgCl, for model ingots.

It was found that the manner in which AgCl freezes, its semitransparency, and the plasticity of solid AgCl recommended it for such use.

Solid particles of insoluble materials may be introduced into molten AgCl and their separation and distribution during freezing may be noted. Simulation of inclusions in steel is thus possible. Graphite, quartz and other materials may be used for this purpose.

MARCUS A. GROSSMANN, Carnegie-Illinois Steel Corp., Chicago, winner of the Robert W. Hunt gold medal.

CYRIL STANLEY SMITH, American Brass Co., Waterbury, Conn., is the new chairman of the Institute of Metals Division, AIME.

HERBERT W. GRAHAM, Jones & Laughlin Steel Co., Pittsburgh, is the new chairman of the Iron and Steel Division, AIME.

The problem of distribution of insoluble nonmetallic particles such as alumina and other refractory oxides is of considerable importance in steel ingots. This problem has not been considered in work on wax or nonferrous models. Most of the nonmetallics were eliminated in three of the four ingots in which they were included, having floated to the top. Evidently the particle size used was too large, and the experiment must be repeated with finer material. Some of the graphite, however, was entrapped near the bottom of the fourth ingot. Dickinson and Hare and Soler report predominance of refractory types of nonmetallics in the bottom central portions of steel ingots.

Several ingots of pure AgCl were cast in a larger investment mold, 6 in. high and 1 1/8 in. in diameter. These all showed shrinkage cavities very similar to those found in steel ingots.

Thus, preliminary results give reason to believe that the grain structure, pipe, segregation, and the distribution of non-metallics in larger ingots may be studied by these models.

Among other observations made by the authors were the following:

The depth of the columnar crystal is always greater in the ingots poured at the higher temperature. The higher rate of heat transfer at the start of solidification, as well as the lower rate of nucleation, would account for these deeper zones of columnar crystals. Similar effects have been noted in steel ingots by Leitner and by Hohage and Schafer.

There is a slightly finer grain in both the columnar and the equiaxed grain regions of the ingots poured at the lower temperatures. The columnar crystals slope slightly upward from the edge toward the center of the ingots. Northcott found a similar slope to the columnar crystals in steel ingots and described it as an inclination of the crystals toward the direction from which the liquid steel flowed along the mold face. Zhegalov and Tageev explained the slope of the columnar crystals as following the line of heat flow from the thermal center of the ingot through the mold wall.

A much greater lack of uniformity of the equiaxed grain size prevails in the big-end-down ingot than was noted in any of the big-end-up ingots.

Transparencies for Optical Comparators

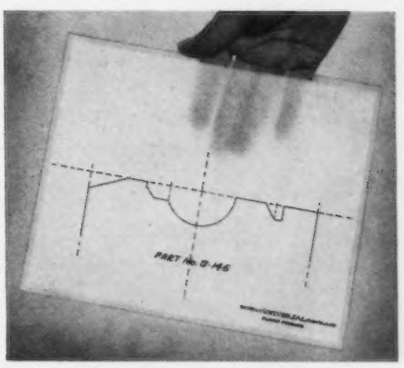
TO make it possible to work to decreased tolerances on optical projection equipment and to employ batteries of instruments, widely separated, in the manufacture of identical parts, the Industrial Engineer's Specialties Division of the Universal Engraving & Colorplate Co., 588 Monroe Street, Buffalo, has developed comparator charts, known as Engineer's-Transparencies. These charts are reproduced duplicates of drawings made on their Engineer's-Glass, which is plate glass 1/8 in. thick, with carefully ground edges, on which vellum drawing paper has been cemented.

Diagrams can be drawn on with either pencil or pen. As the paper is translucent, the diagrams can be placed directly on the viewing screens of comparators and other micro and contour projectors and checked for accuracy before reproducing, or employed directly as a chart temporarily. As many duplicates of diagrams as desired can be made from a single original design drawn on Engineer's-Glass.

Since penciled designs are easily erased, one sheet of Engineer's-Glass can be used repeatedly. However, if the same charts are to be used to a considerable extent, it is desirable to ink them in and have an Engineer's-Transparency made for use. After reproduction, the original can be filed away and duplicates made for subcontractors or for replacements at a later date.

Engineer's-Transparencies are made on ground glass or clear glass. In the former, the black image is on the back or ground side of the plate glass and is in contact with the viewing screen. Transparencies made on clear glass have a mirror image which is placed with the image in contact with the viewing screen, thus placing the lines of the chart and the silhouette image in the same focal plane.

When a number of small parts are to be checked, it is sometimes more convenient to use circular rather than square glasses and to have several diagrams drawn on one circle. The resulting transparency can be revolved as each part is checked, thus eliminating the loss of time involved in removing charts of separate parts from the projector and replacing them with others.



OUTLINE of a dovetail form tool inked on Engineer's-Glass. From such a master any required number of duplicates may be made.

o o o

Color-keyed transparencies may be made on either clear glass or ground glass in either right or "mirror" images for use in indicating tolerance lines. These are like the regular transparencies except that the lines appear in two or more colors. The original designs are drawn with black India ink. The separation of colors occurs when the Engineer's-Transparencies are made.

Scribing Engineer's-Glass is clear plate glass which is covered with a uniform, thin, red coating. Scribing tools and machines are employed in scribing through this coating to the surface of the glass. The lines are then transparent on a red background. This method is sometimes preferred when the engineer or draftsman is working with Johansson, Webber or other precision gages. Fine and uniform lines can be scribed, making this glass desirable when drawing radius charts or charts of similar character.

Engineer's-Glass is an ideal medium for making exact templates on almost any material selected. The original diagram on the glass is prepared in the same manner as the preparatory drawings for Engineer's-Transparencies, and may be reduced or enlarged to a desired size.

Paper Patterns Save Vital Materials

A TECHNIQUE of cutting out "paper dolls" and making jig saw puzzles of them is helping save valuable sheet and plate stock at various General Electric plants. After the designs for a new product have been engineered, blueprints specifying the shape, size and thickness of parts are furnished the planning department. One of the responsibilities of this department is the development of methods for obtaining the greatest number of parts from the smallest amount of materials. The best possible nesting arrangements for such simple shapes as squares, triangles and circles can be expressed in simple formulas so that, given the measurement of a part, a planning man can check readily the ideal length and width of material from which they are to be cut.

Often, however, complicated parts differing widely in shape and size must be nested together and here the planning department used the "cut and try" method. Parts are drawn to scale on ordinary paper, then cut out with a pair of scissors. The pieces of paper are then shifted around until they nest snugly within the proportionate size of a stock sheet of metal, Fig. 1, much as the pieces of a jig-saw puzzle are fitted together. Often parts for more than one product are placed in the same layout in order to obtain closer nesting. When the planning department discovers that slight changes in the

FIG. 1—Working with paper segments, a General Electric planner arranges a layout for parts to be cut later from metal plates.

o o o

length, width or thickness of a part will enable more parts to be cut from the same layout, the engineers who designed the part are consulted to see if the change is possible. The layout is then sent to the factory for guidance in actual cutting. Fig. 2 shows a sheet laid out to utilize every bit of material possible.

In obtaining circular parts which must be of a solid piece, virtually all of the space remaining in the squares from which they are cut is used. For example, one stamping job called for a number of ring shapes and another for a quantity of pieces shaped like a top hat and twice as thick as the ring shape. Designs were changed so that the thicknesses were the same, enabling both parts to be cut from the same square sheets, Fig. 3.

Last year production of an important war item was threatened by slow deliveries of heavy steel plates to General Electric. From these plates were cut a large circular-shaped part, divided into four 90-deg. segments. The segments can be cut from a much smaller plate than the full circle would require, and later welded together.

The problem of adapting this particular layout to plates of a size already available was solved by Spencer Frederick, a worker whose job is to make the full-sized layouts. He suggested dividing the circle-shaped part into six rather than four segments, because 60-deg. segments, having more shallow arcs than those of 90 deg., can be nested more closely. The suggestion saved 537,000 lb. of steel last year. For this suggestion and a similar one Mr. Frederick has received awards totaling $1,025. He is one of the men on the production line contributing to the solution of material conservation problems by volunteering layout suggestions.

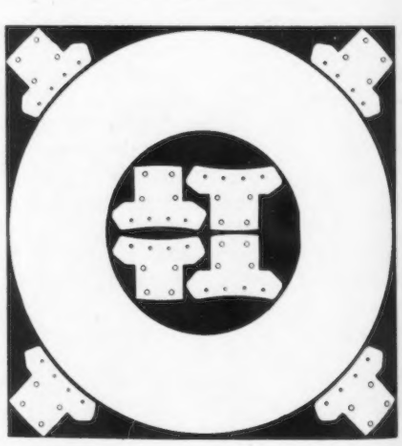
ABOVE

FIG. 2—How two rings can be cut from a square steel plate. The second is cut in segments from the center portion and welded together.

o o o

BELOW

FIG. 4—By arranging for the ring shape shown to be cut in six 60-deg. segments (right) instead of four 90-deg. segments (left), closer nesting is possible. This one idea saved over 250 tons of steel last year.



ABOVE

FIG. 3—An arrangement for obtaining a large circular piece and eight small parts for motors from a piece of material.

ATTACK

IS THE BEST DEFENSE!

HERE'S HOW TO ATTACK YOUR BATTERY MAINTENANCE PROBLEMS

1. Keep adding approved water at regular intervals. Most local water is safe. Ask us if yours is safe.
2. Keep the top of the battery and battery container clean and dry at all times. This will assure maximum protection of the inner parts.
3. Keep the battery fully charged — but avoid excessive over-charge. A storage battery will last longer when charged at its proper voltage.
4. Record water additions, voltage, and gravity readings. Don't trust your memory. Write down a complete record of your battery's life history. Compare readings.

If you wish more detailed information, or have a special battery problem, don't hesitate to write to Exide. We want you to get the long-life built into every Exide Battery. Ask for booklet Form 1982.

Our strongest defense is a hard attack. That's an old Naval tradition now proving its truth on all the waters of the Seven Seas.

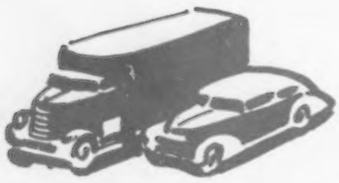
In similar fashion, the best defense against maintenance problems is a relentless, unceasing attack on carelessness and wear. Battery care, for example, is simplified if you observe four basic rules . . . which may be called your rules for attacking battery maintenance problems. Follow them faithfully, and remember, Buy to Last and Save to Win!

Exide
IRONCLAD
BATTERIES

THE ELECTRIC STORAGE BATTERY COMPANY, Philadelphia
The World's Largest Manufacturers of Storage Batteries for Every Purpose
Exide Batteries of Canada, Limited, Toronto

Assembly Line . . .

• Willow Run manpower problems cast shadow over ambitious output projections . . . Pooling of manpower studied in Detroit . . . Eberstadt resignation not expected to bear heavily on CMP.



DETROIT — The tooling and make-ready headaches of Willow Run are passing into history. But their disappearance is making room for a problem of equally difficult nature. While work is on schedule today, lack of manpower is said to be holding up progress toward peak levels planned for late 1943.

Willow Run lies some 20 miles away from the manpower reserves of Detroit, and there seems to be considerable reluctance to travel that far to and from work. Despite the new superhighway to Willow Run from Detroit's east side outskirts, a worker riding the bus or driving at maximum 35-mile-an-hour speed may consume two to three hours daily traveling between his home and his job. Other things being equal, he seeks and finds work nearer home. The Jap cutoff of rubber for tires is developing into a sizable obstacle to mass production at Willow Run.

Payrolls at the plant today are considerably less than half of the ultimate totals which will be required in the fall. To build them up Ford would like to hire as many as 400 men and women daily right now. But average applications per day generally run below half that amount and against such totals the number of quits recorded on many days comes close to equaling this figure and not uncommonly they exceed it. Net gains during February have been under 100 a day more often than they have been over, with 75 per cent or more of the advances concentrated among women employees.

Reasons for quitting show a wide range. To date about a third have been due to entry into the military service, either by draft or enlistment. Other quits include considerable numbers who simply did not report for work over a 10-day period without notifying the company, and were stricken from the rolls. An almost equal number gave as their reason that it was "too far to come." Noteworthy quantities of employees found other work, despite the Detroit area job stabilization plan, which Ford officials do not find very effective thus far.

BUT even if there were no quits at all, current incoming applications are insufficient to fill up work stations being created daily by the progress of the tooling job. It is obvious that at today's hiring rates the employment peak required for volume production will not be reached next fall. Spring and summer can be expected to increase the velocity of payroll enlargement, after elimination of present weather conditions which make the drive to Willow Run difficult. But improved weather alone will not entirely solve this situation. Development of a solution is causing headaches in both Detroit and Washington.

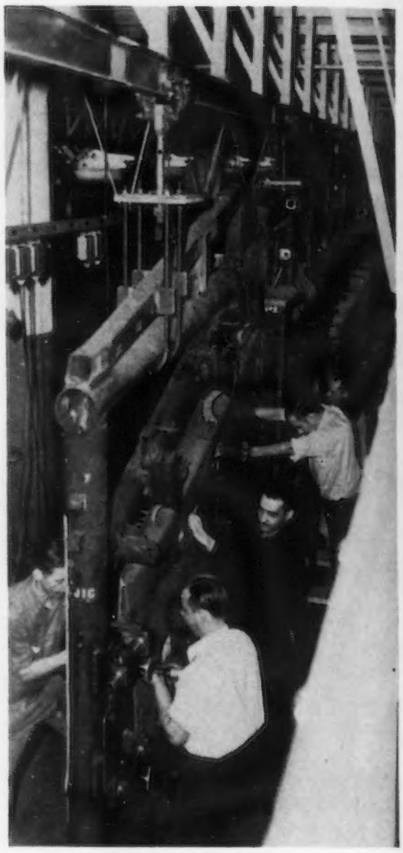
Applicable to Willow Run only as it constitutes one plant in the Detroit area is a suggestion from Col. George E. Strong, internal security chief of the Army Air Forces, that the labor supply in Detroit be pooled for most effective utilization. Somewhat similar proposals have come from UAW vice-president Walter Reuther. The Automotive Council for War Production is studying the idea with the thought of possible sponsorship of a program.

The main stumbling block to labor pooling in Detroit appears to be the difficulty in setting up such a plan. The actual physical detail of coordinating employers, the union and the individual employee is considered extremely difficult. In each case of transfer, it is pointed out, there would be four or more parties involved—the two employers, at least one labor organization and the individual concerned.

To illustrate the program, Company A finds its schedules temporarily reduced or it cannot obtain materials, so it cuts its schedules to 40 hours of work or less. Its men then become subject to borrowing. Company B needs them and takes them on, subject to recall at any time. The relief for Company B, obviously is only temporary. Additional workers will have to be trained for the Company B jobs which may open up again whenever Company A schedules are restored. If trainees can be obtained, the question arises as to who will train them.

PROPONENTS of the idea suggest that Company A, with temporarily spare facilities, do the training. There, at once, are problems. Should Company A pay the training cost? Should Company B absorb the cost, knowing that the men may not be trained exactly to its liking?

And how about the workers themselves, trainees and skilled men alike? Will they relish job transfers which



Wide World

MAKING WINGS FOR WAR BIRDS: Adapting automobile industry technique to the production of Thunderbolt pursuit planes, the Murray Corp. of America, which is making wing assemblies for that craft as well as for the Flying Fortress, has developed an overhead conveyor that permits assembly operations with the wing on its edge in constantly moving jigs.

Tool Conservation Begins in the Tool Crib

Photographs Courtesy Weatherhead Company, Cleveland, Ohio

WITH GAGES IT'S *System*

Before a gage is returned to the storage rack, it is thoroughly checked and inspected, and any adjustments or repairs needed are made or ordered.

Felt-lined individual compartments protect the gages from injury and provide a practical visual check on the gage stock.

Metal check method of issuing and card record of stock condition, with carefully trained attendant, assure positive control of entire gaging system. This "Tool Crib" is air conditioned.

Well-equipped factories in mass production industries do not select their gages haphazardly or just by chance. Their gaging systems are completely integrated and adapted to their particular requirements. But no matter what a plant's gaging needs, all gaging systems should include at least three fundamental features:

1 **Adequate checking and measuring equipment** — gages need constant checking for significant wear, damage or tampering.

2 **Convenient, safe, systematic storage** — poor storage conditions can ruin gages even before they are used once, and a lost or misplaced gage means loss of valuable time as well.

3 **A positive accounting method** — when new gages are needed, they are usually needed badly, therefore proper accounting for every gage at all times avoids disruption of the gaging system through delays in anticipating requirements.

GREENFIELD TAP AND DIE CORPORATION
GREENFIELD, MASSACHUSETTS
DETROIT PLANT: 5850 Second Boulevard
WAREHOUSES in New York, Chicago and Los Angeles
In Canada:
GREENFIELD TAP AND DIE CORP. OF CANADA, LTD., GALT, ONT.

ARMY E NAVY

GTD GREENFIELD

TAPS · · · DIES · · · GAGES · · · TWIST DRILLS · · · SCREW PLATES

upset their transportation arrangements? How will possibly divergent pay schedules be reconciled?

Another potent argument against pooling is the difficulty in acclimatizing experienced by all workers. One factory manager states that even a sweeper, moved from one floor to another in a factory, requires about a week before he functions efficiently. A machine operator, moving to a new plant, has equal or greater difficulties in orientation. The problem of an aircraft riveter, going from a job in one plant to a similar job in another, would be more greatly complicated, inasmuch as no two riveting operations, even though they both may be on aircraft wings, are identical. The effectiveness of job pooling is dubious unless borrowings extend over a minimum period of at least a month or two.

Such difficulties do not necessarily make manpower pooling impractical. Hard-and-fast conclusions cannot be drawn at this stage of the game; variations which may be worked out on the idea may prove a worthwhile contribution to the war production program.

Returning to the Ford arms production picture, a more optimistic note is found in the way Ford M-4 tank production has been speeded up by use of women welders. The program marks the first time in the Detroit area that mass quantities of girls have been used on such work.

About half of the welders in the Ford tank plant are women. They are working out very well, Ford officials state. Training for all student welders, male and female alike, runs from six days to six weeks, the shorter time being required for otherwise experienced welders going to work on armor plate for the first time. Among students who are new to welding the girls seem to catch on as quickly as do the men, and are working out very satisfactorily on production jobs.

Girl welders are also being used to run Unionmelt machines, of which there is a good-sized battery at the tank plant. It takes about three weeks to train an operator to function on the Unionmelt machines, a touring party of newsmen was told this week; Unionmelt results generally were very satisfactory.

THE resignation of Ferdinand Eberstadt from the WPB is not expected in Detroit to make a great deal of difference as regards administration and progress of the Controlled Materials Plan, even though

Wide World

HIS BUSINESS IS POWER: Here is an unconventional type of executive, short, dynamic 42-year-old Clarence Reese, president of Continental Motors Corp., who works usually without coat or vest and almost invariably wearing his hat, and is pictured here in his Detroit office.

Detroit sources qualify this expectation with the observation that they are speaking only from general knowledge of the situation rather than any special insight into it.

The viewpoint is that the Controlled Materials Plan has moved so far that it would be extremely difficult to eliminate or greatly change its basic concepts at this stage, even though Mr. Eberstadt, its chief proponent, has left the scene.

There is considerable hope that, if a new B product list is issued for third quarter CMP applications, it will clarify the classifications of all products. If this new list comes out, it is expected to be published almost any day, perhaps by the time this appears in print. Advance indications are that any such new B list will be developed by an interpretation of use of the product rather than by flatly classifying items in one listing or the other. That is to say, an internal combustion engine, when scheduled by a claimant agency for use in an end product would classify as an A product. The same internal combustion engine selling "off the shelf," might be a B product. Development of classifications in this manner, indicating a rather fluid train of thought based on a commonsense approach, is figured by Detroit industrial sources as a worthwhile contribution to the plan.

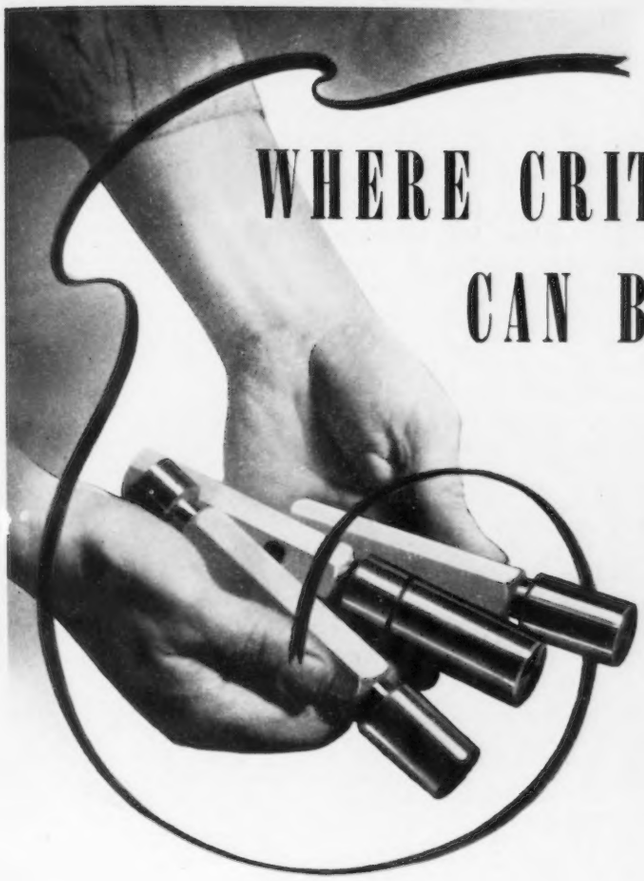
A meeting held in Detroit last week with Aircraft Scheduling Unit officials was attended by several hundred industry representatives. Questions from the floor developed the fact that the MRO (Maintenance, Repair and Operating supplies) symbol can be used to order tools, jigs, dies and fixtures if they are normally carried as operating supplies. Large items costing over $500 which are carried on capital account cannot be ordered as MRO supplies. Manufacturers making their own jigs can use the MRO symbol to buy controlled materials, and likewise may buy such materials to pass on to their tool makers.

THE administrative framework of the Aircraft Scheduling Unit was described to this meeting by Col. E. M. Powers, administrator of ASU. He reported that ASU is under the direct supervision of Mr. C. E. Wilson's three-man aircraft board. The ASU itself includes Col. Powers, Capt. Lee, representing the Navy, and Col. Kay, representing the British armed forces. The staff is from the production division of Wright Field, and handles all problems of materials requirements, materials handling, statistics, tools and facilities. There are four procurement districts, headquartered in New York, Detroit, Wichita and Los Angeles.

Detroit tool shops have been hopeful that anticipated declines in their volume, looming up for the next few months, would be stemmed by an incoming flow of work to tool the huge Dodge-Chicago plant. It appears, however, that comparatively little of this work will come into Detroit.

Reports in Detroit industrial circles are that Dodge-Chicago has completed a large tool room, of a size close to that of the Ford tool facilities at River Rouge, and that its force of several thousand men is at work on the greater share of tremendous quantities of special tools, dies and fixtures required for manufacturing.

There are, of course, other very large projects going forward in the north central area of the country, a share of whose tooling will likely be placed in Detroit shops. It does not appear, however, that any of these forthcoming near-prospect jobs will develop volume sufficient to equal the great flood of work required last year, whose peak passed during the late fall months of 1942.



WHERE CRITICAL MATERIALS CAN BE *Conserved*

By The Use Of HARD CHROME PLATING

By The Use Of CARBOLOY CEMENTED-CARBIDE

Wear-resistance in gages can provide the means to save critical materials—used both in the manufacture of the gages themselves and in parts which require extremely accurate inspection.

New gages supplied in hard chrome plate or Carboloy cemented-carbide have much greater life than those made of steel. It is obvious that, by their use, in high production gaging, the amount of steel required for ordinary gages—in quantities which will provide proportionate inspection usefulness—can be used for other purposes. In salvaging worn steel gages by chrome plating, no new steel is required and the life of the gage is increased to approximately five times its original period of service.

Of equal importance, is the increased manufacturing tolerances made possible by the use of wear-resistant gages. Chrome plated and Carboloy gages produced by Lincoln Park can be specified extremely close to required limits. Allowance for wear can be reduced considerably, automatically adding to manufacturing tolerances. This slight extra percentage of tolerance is especially important when parts being inspected are very close to required limits. It eliminates rejections of parts that should be accepted which, in many cases, results in great savings in expensive parts—and the critical materials used in them—and in man and machine hours.

HARD CHROME PLATE—Provides approximately five times the wear-resistance of steel. Lincoln Park—with complete, modern facilities for preparation, plating and finishing — supplies new chrome plated gages and also salvages worn steel gages by plating. A new service is also offered in the salvaging by hard chrome plating of worn surface plates.

CARBOLOY—Provides more than fifty times the wear-resistance of ordinary gages. Lincoln Park pioneered the use of these cemented-carbides in gage manufacture, and for a number of years has been the largest user of Carboloy in the gage industry. A wide variety of gages and non-cutting precision tools of this material are now produced in the Lincoln Park plant.

ARMY E NAVY

LINCOLN PARK TOOL and GAGE CO.

LINCOLN PARK, MICHIGAN

Washington . . .

• Congress concerned over monopoly growth through war contracts . . . Johnson promises more contract spreading . . . Truman charges Nelson is influenced by big business conspirators.

WASHINGTON — Congress is concerned with the fact that 70.1 per cent of the $84,978,300,000 awarded thus far in war contracts has gone to 100 companies. Senator Joseph C. O'Mahoney, Democrat, of Wyoming, speaking on the floor of the Senate on Feb. 11, listed 20 companies having the largest total volume of war contracts. He pointed out that one of the causes for this concentration is that most of the large contracts have been awarded for the construction of airplanes, cargo vessels, escort vessels and other implements of war which are most needed if "we are to successfully fight this war."

General Motors comes first with contracts amounting to $7,251,100,000. The remainder of the first 20 follow in order: Curtiss-Wright Corp., Bethlehem Steel Corp., Douglas Aircraft Co., Inc., United Aircraft Corp., Ford Motor Co., Boeing Airplane Co., Consolidated Aircraft Corp., United States Steel Corp., Chrysler Corp., Lockheed Aircraft Corp., Aviation Corp., Glenn L. Martin Co., Newport News Shipbuilding & Drydock Co., General Electric Co., Todd Shipyards Corp., North American Aviation Inc., American Telephone & Telegraph Co., E. I. du Pont de Nemours & Co., and the Sperry Corp.

Now it is easy to dismiss the seriousness of the fact that the needs of war have forced heavy concentration of orders in companies best equipped and large enough to accommodate United States military requirements. It is equally easy to fall upon the point that social aims should not interfere with war production and to say that to put a fire out it is necessary to call in the fire department.

SENATORS have pointed out that if monopoly is permitted to grow too great, there will be a dangerous trend toward Facism after the war. While this fear seems foolish just now, it is perfectly easy to see that it should be in self-interest that big business would try to spread war orders as far as possible. For, the very size of business interests sometimes makes it very easy for government to take over their control.

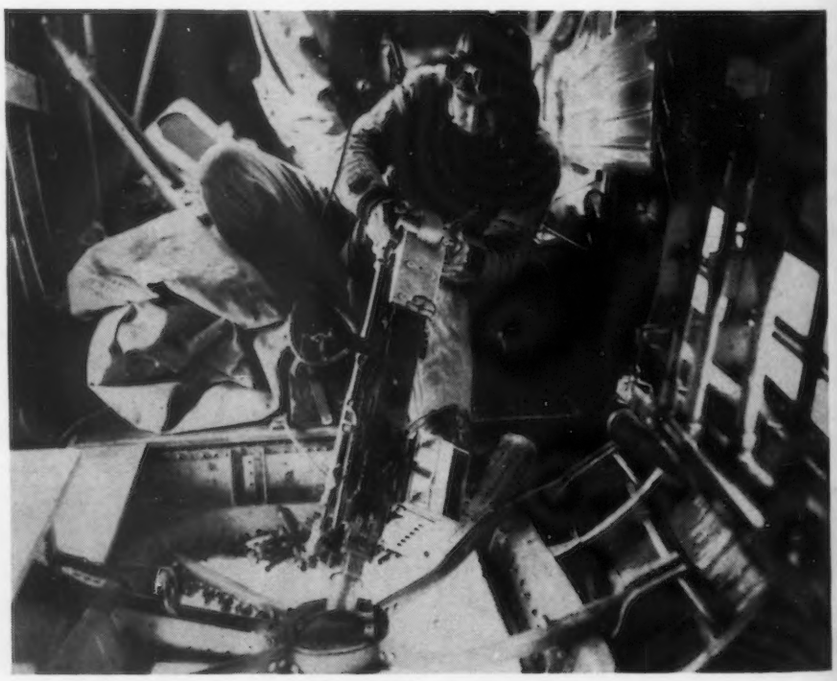
The explanation of course for the concentration is obvious. America needed weapons when the war broke out, and it was only natural for the Army, Navy and Maritime Commission to seek the companies that could furnish them quickly and in the greatest quantities. But now that the war program is crystalizing and weapons are being produced in satisfactory numbers, there is more and more sentiment among industrialists representing firms of all sizes to try to spread government contracts.

Therefore, it would seem that the efforts of the Smaller War Plants Corp. now take on greater importance than ever before. The contract distribution efforts of Floyd Odlum and others which seemed trivial at the time will prove to have been well worth while, observers say. So far, SWPC reports that it has been responsible for about $846,000,000 worth of contracts, though this does not include subcontracting for which the armed services have been responsible.

Col. Robert W. Johnson who is chairman of SWPC told reporters at a recent conference that the organization would aim at a spread of contracts amounting to $35,000,000,000, if possible. He said he would try to assist companies having 100 employees and under.

THE SWPC Chairman asserted that the job would have to be decentralized to the war production centers—that it couldn't be done in Washington. Every method possible under the SWPC act will be used, he continued. Pooling, the actual transfer of contracts from big companies where order backlogs are too great, the finding of contracts, lending money, and persuasion of the armed services and industry to spread orders, will all be employed to do the job.

Laying great emphasis on the importance of mental attitude as the factor determining whether a given task is possible, Colonel Johnson said



Assembling machines for BULLETS BUILT FASTER

SUNOCO EMULSIFYING CUTTING OIL

"helps machine manufacturer prolong tool life by 40%"

Bullet assembling machines are the wartime specialty of this machine tool manufacturer . . . and one factor that's contributing to their high production quota is Sunoco Emulsifying Cutting Oil.

Before changing to Sunoco, excessive heat made necessary low machine speeds. Production was limited . . . tool life poor. At the recommendation of a Sun Doctor of Industry—a metal working expert—the change in cutting oil was made. Improvement was immediate. Tool life increased 40%. Sunoco's exceptional heat absorbing qualities permitted high speeds . . . production was increased 40% and the finish of parts was noticeably better.

This is one example among many where Sunoco Emulsifying Cutting Oil is helping American industry turn out a flood of better war materials—faster. Call in a Sun Oil Company Engineer. Let him show you the value of Sunoco as an aid to increased production in your own plant. He stands ready . . . willing . . . and able to serve you.

For case histories of how he has helped others, write for your copy of "Helping Industry Help America."

SUN OIL COMPANY • ***Philadelphia***

Sun Oil Company, Ltd., Canada

SUNOCO

UN PETROLEUM PRODUCTS *HELPING INDUSTRY HELP AMERICA*

that small business could be preserved if the procurement services and business made up their minds to do it. He urged business men to develop a social responsibility toward their smaller competitors who now occupy a different position in time of war, but denied that it was avarice which caused the piling up of tremendous order backlogs. Rather, he said, it was a "cultural" lag which was responsible for opposition to spreading of orders among the smaller plants. Industry and the armed services' procurement agencies are the groups that will be responsible for spreading of orders, though he pointed out that much production had been scheduled as far in the future as the latter part of 1944.

The WPB regional and field offices are to be empowered to make loans to businesses "which have been presumably turned down by RFC, and commercial banks." The limit set for the regional offices is $25,000, but this limit may be later raised. Interest rates vary from 2 to 5 per cent and the terms of loans run from 90 days to three years. SWPC has $140,000,000 to loan, and Colonel Johnson said that the money will be disbursed to "submarginal" and "shoe-string" enterprises. Subsidized companies will be chosen on the basis of their value to the war effort, Colonel Johnson said. But he admitted that he did not know how these companies could be identified—beyond this test, that the definition was ambiguous.

THE anxiety of Congress, which Senators are expressing, came out in a debate on whether SWPC is carrying out the provisions of the Small War Plants act. This act was set up to get a fair proportion of business for small plants and as an anti-trust brake inasmuch as anti-trust laws have been generally relaxed for the duration.

Senator Truman, Democrat of Missouri, and Senate Majority Leader Alben Barkley of Kentucky, were frankly critical of WPB for "thwarting" the SWPC from carrying out the intention of Congress. Senator Barkley charged that SWPC had not been admitted to WPB weekly meetings and both Senators agreed that perhaps it would be better if SWPC were set up separate from WPB to prevent big business from crushing the organization's aims.

A conspiracy charge was hurled at WPB men who influenced WPB Chairman Donald M. Nelson to replace Lou Holland who formerly headed up SWPC with Colonel Johnson, prominent and wealthy surgical supply manufacturer. Mr. Nelson had reported that Mr. Holland, who was former president of the Kansas City Chamber of Commerce, had done a good job but gave no reason for replacing him with Colonel Johnson. Mr. Nelson appointed Colonel Johnson on Jan. 19 to the position of WPB vice-chairman and Chairman of SWPC. Meanwhile, Mr. Holland submitted his resignation last Wednesday. He assailed the conduct of the plans for small business. He indicated his dissatisfaction with the present WPB set-up. Mr. Holland had previously agreed to Mr. Nelson's suggestion that he remain with the organization as Colonel Johnson's assistant.

SENATOR Truman in the same discussion said:

"Mr. Sidney Weinberg of the Wall Street banking firm of Goldman Sachs & Co., acting as personnel adviser for the War Production Board, had been seeking this appointment for Colonel Johnson since last June. Colonel Johnson may be a fine gentleman for all I know, although I distinctly was not impressed by the reports concerning Colonel Johnson which I found had been made to Sidney Weinberg by his own investigators."

Indeed on this question of why Mr. Holland was removed, Senator Truman expressed the opinion that Mr. Nelson was being influenced by "conspirators in whom he placed too much confidence."

Senator Truman said:

"I think those gentlemen are there for the purpose of representing big business, and have no other purpose, and when Mr. Holland was on the point of achieving success, they succeeded in upsetting the whole apple cart and taking a new start, and no matter what Mr. Johnson may do, if he is honestly going to try to help little business, and if he reaches a point where he is about to make a success of it, they will do exactly the same thing to him."

SENATOR Pepper, Democrat of Florida, rejoined as follows:

"Mr. President, if the evdence after a reasonable opportunity should disclose even the suggestion of what the able Senator from Missouri has said —and he is chairman of a special defense investigating committee and may keep a careful eye on the conduct of this agency—then Mr. Donald Nelson not only needs to be impeached by Congress, as far as that is possible, but to be driven with discredit out of the high office he holds. That, Mr. President, seems to me would be an inevitable judgment upon such wrong doing."

THE BULL OF THE WOODS — BY J. R. WILLIAMS

YOU WON'T HAVE TO KNOW MUCH TO RUN THIS MACHINE--THE JIG KEEPS YOU FROM MAKIN' MISTAKES--IT'LL GET EASIER FOR YOU AS YOU GO ALONG!
HOW LONG DOES A GUY HAFTA BE ON THIS MACHINE TO GET A RAISE?
HA-HA! HE JUST TOLD 'IM HE DOESN'T NEED TO KNOW ANYTHING ON THERE, AN' HE EXPECTS A RAISE FOR KNOWIN' NOTHIN' EASIER!
IF HE'D OF TOLD HIM HE DIDN'T NEED TO DO ANYTHING EITHER, HE'D OF THOUGHT IT WAS AN IMPORTANT JOB AN' WAS WORTH MORE
COPR. 1943 BY NEA SERVICE, INC. T. M. REG. U. S. PAT. OFF.
HIGH FINANCE
J.R.WILLIAMS 2-26

Good Automatics DESERVE Good Operators

Good operators can get the most from any machine, and, because seconds count so much, automatics should be kept in use at peak efficiency.

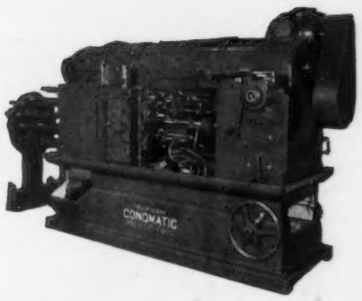
The Departmental Design of Conomatics helps new operators to learn faster. The extra rigid cross-slide construction permits holding heavier forming cuts to closer tolerances.

Cone handbooks are useful in helping both new and experienced operators to get excellent results from Cone machines.

PRIME YOUR PRODUCTION PULSE — SPECIFY CONES

CONE AUTOMATIC MACHINE COMPANY, INC.

WINDSOR, VERMONT
U. S. A.



WEST COAST . . .

• Better utilization of present employees seen as solution to manpower problem, rather than increased hiring of aged, infirm and sub-standard workers . . . More attention will be given training.

SAN FRANCISCO — Potentially the largest remaining man-hour pool in the critical and near critical far western labor areas lies in better utilization of present employees rather than in increasing the hiring of aged, infirm, and sub-standard employables. Emphasis in the past year has centered on willy-nilly hiring of workers almost completely lacking in experience and training on the job. Because much of the work which has been undertaken on the Coast, principally in shipbuilding and aircraft, is as new to the employer as anybody, coupled with an almost complete lack of know-how in the community, training on the job has been more or less a matter of necessary evolution. Now, with the supply of potential trainables running dangerously low, and a severe question arising as to how many of the job applicants henceforth will be adaptable to training, more intensive attention is being given generally to cutting out lost motion and increasing efficiency.

Up until now, in the San Francisco Bay area, the brunt of programming the training of industrial neophytes into possible shipbuilders has fallen on the shoulders of a highly efficient but little publicized agency now known as Training Within Industry of the War Manpower Commission, but whose record of Federal affiliation has been varied. The Training Within Industry organization has centered its efforts on what it calls "job instructor training" which amounts to huddling foremen and leadermen at any given plant and teaching them in small groups, how to put over to raw recruits the fundamentals of the work with which they are charged. Nationally, TWI has put about 375,000 people through its job instructor course. Because of the completely new character of work involved in shipbuilding, and because of the large numbers of new employees, the agency has trained a larger number in proportion to the total working force here than in other sections. It is estimated that about one out of every ten employees in war industry is a prospect for job instructor training. On that basis, the potential for this area has nearly been reached. Industry looked askance at the program at first, believing that it involved teaching foremen their individual specialized jobs, but as it became clear that only the teaching of educational methods was involved, the reception has become warmer. Because foremen are often promoted to their posts because they are crackerjack workers, though completely lacking in the ability to pass on their knowledge to others, their need for instruction as instructors has increased the calls for the training.

AS the total labor force approaches its peak, the need for more job instructors will decline and the Training Within Industry Division will concentrate its efforts on teaching plant supervisors to analyze and improve methods of doing specific jobs. The concept of and approach to job analysis is an old story to veteran supervisors in long established industries, but in so recently blossomed an industry as shipbuilding, operating in a region relatively untrained in metal working and supervised by men just up from the ranks, spreading the gospel of job analysis should pay tremendous dividends. Mass fabrication and assembly of ships along standardized patterns presents almost a virgin field for polishing of methods and technics. The principles involved in training supervisors to improve job methods are fundamental — break down the job, question every detail, develop and put the new method into application.

TWI will give such training to groups of 12 plant supervisors in five two-hour sessions at any periods convenient to the companies and those who attend. The sessions will, in most cases, be led by specially selected employees of the firm in whose plant the course is being given, but where these are unavailable qualified trainers will be taken from other firms. All trainers will be specially prepared and coached to carry on the program during a four-day session conducted by a TWI representative without cost to the company.

The fertile field which exists for job analysis and improvement is well illustrated by the type of contributions which have been winning employee suggestion contests at shipyards in this area, ideas which are the result of nothing more than a little hard thinking. At one of the Richmond Maritime Commission yards a chipper-riveter foreman eight months ago was worried by the skill and time lost to chip or burn a slot out of all hand-welded seams at each point where the shell plate touched the frames or ribs of every hull. In this slot the edges of both plates could be welded to the ship's frame. By burning the slots out of the edge of each strake before it is bolted to the frames or ribs of the hull, this foreman reasoned that an inexpert burner could do the job in a few seconds per slot, and so introduced this method of "gouge-burning," with a very considerable saving, according to the yard.

A recent idea contest winner at an affiliated yard was a boiler maker who found the method employed in prefabrication of exhaust vents for Liberty ships tedious. The plates forming these vents, or "up takes" in the original design were joined at acute or obtuse angles, necessitating careful fitting of bevels. By experimenting with cardboard patterns, on a touch and try basis, a cardboard model of an uptake was produced which could be fitted together with fewer acute and obtuse and many more right angles. The new design saved about 100 man hours per uptake.

Other prize winners were a burner and machinist who collaborated to design and construct a burning jig mounted on small wheels to facilitate straight line burning on specialized hand work requiring accuracy. The device consisted merely of applying a recognized principle to a specific task, but it apparently had been overlooked by designers concerned with more important work.

Not all the lubricants being introduced to speed up the industrial machine are of such a fundamental and serious nature, however. At still another unit of the Richmond shipyards the task of time-checking has been turned over to a crew of 45 girls

IN THE AIRCRAFT AS IN OTHER INDUSTRIES

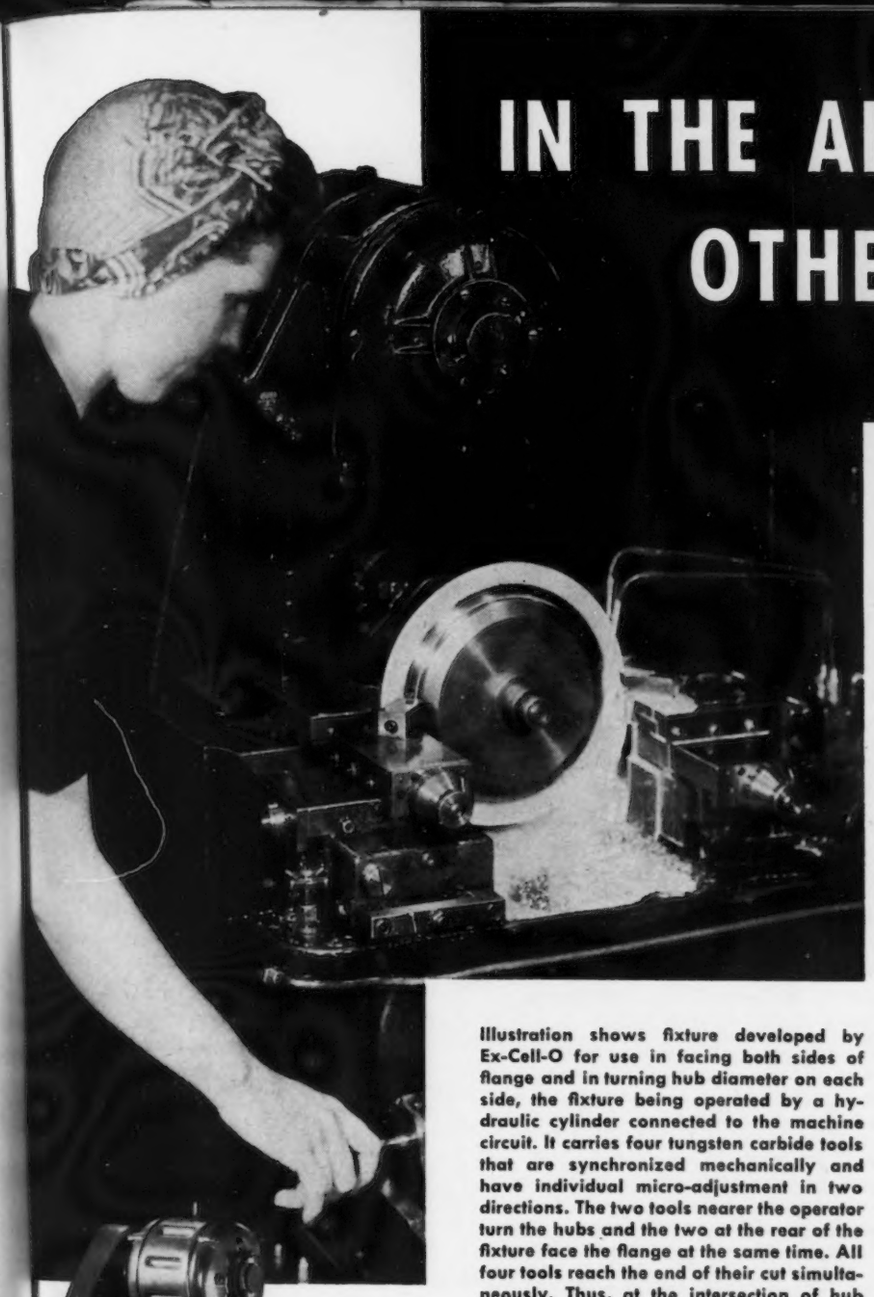


Illustration shows fixture developed by Ex-Cell-O for use in facing both sides of flange and in turning hub diameter on each side, the fixture being operated by a hydraulic cylinder connected to the machine circuit. It carries four tungsten carbide tools that are synchronized mechanically and have individual micro-adjustment in two directions. The two tools nearer the operator turn the hubs and the two at the rear of the fixture face the flange at the same time. All four tools reach the end of their cut simultaneously. Thus, at the intersection of hub O.D. and flange face, each tool is relieved of a plunge cut by the tool on the opposite side. This feature eliminated considerable tool breakage. Former method for machining this aircraft part required three set-ups and production was just one-third of that attained in the one set-up shown above. MACHINE: *Ex-Cell-O 112-C Precision Boring.*

EX-CELL-O

Machine Tools Bring Speed and Accuracy to War Production!

TAKE *aircraft engines,* for instance. Since fateful December 7, 1941, U. S. aircraft engine production has increased, by horsepower, approximately 240%—actually, in dollar value, there is now more aircraft engine horsepower being delivered every 14 days by American industry than during the whole of World War I. In the turning out of these aircraft engines, Ex-Cell-O is a definite factor. Not only has Ex-Cell-O one of the country's largest precision aircraft parts divisions, but Ex-Cell-O precision machine tools are being used extensively throughout the aircraft industry to produce the many thousands of precision parts needed for aircraft engines. These parts must have a high degree of precision and finish . . . rigid specifications must invariably be observed . . . the parts must be produced as fast as possible. This is the reason why Ex-Cell-O precision machine tools are preferred by managements and workers for the production of these vital parts.

EX-CELL-O CORPORATION • DETROIT

To get best use of your Ex-Cell-O precision boring equipment, you should have the Ex-Cell-O Instruction Book. If you do not have it, write for free copy. State style of Ex-Cell-O machine you are using.

ecision THREAD GRINDING, BORING AND LAPPING MACHINES • TOOL GRIND-
• HYDRAULIC POWER UNITS • GRINDING SPINDLES • BROACHES • CONTINENTAL
TING TOOLS • DRILL JIG BUSHINGS • DIESEL FUEL INJECTION EQUIPMENT
E-PAK CONTAINER MACHINES • R. R. PINS AND BUSHINGS • PRECISION PARTS

XLO

EX-CELL-O *means* PRECISION

SALVAGED CRAFT IN FLOATING DOCK: View in one of the floating docks in Massaua harbor while a smaller craft (right) leans to port. Both ships as well as the floating dock were wrecked by the Italians before they gave up the port.

Wide World

SHIP SALVAGE EXPERT: Capt. Edward Ellsberg, Navy salvage expert, is in charge of salvaging of ships scuttled in the harbor of Massua, Eritrea.

recruited from ex-school teachers, college coeds, sales girls, stenographers and models. The experiment has been adjudged successful, not only because of the aptitude of the girls for detail work, but because of the almost complete impossibility of rough and tough workers registering too strenuous "beefs" about imaginary pay check and time shortages with a comely member of the fair sex. With an increasing number of women welders and production workers, however, the relative advantage of women checkers may soon decline, and even lead to difficulties.

JOB method training, incidentally, has proved particularly necessary among women workers in the aircraft industry. Lacking natural aptitude for handling tools, the women often tend to take awkward, unnatural methods which a man would reject naturally.

California's CIO Council has signified its willingness and intent to tackle the absentee problem in an open letter to regional executives of the War Labor Board, War Manpower Commission and War Production Board. It is CIO's contention that production in shipyards and war plants could be increased 20 per cent and 15,000 men released by reduction in absenteeism and turnover reaching as high as 20 per cent with an average of 12 per cent. Improper utilization of labor is said to waste further manhours so that 20,000 days of labor are lost in the San Francisco Bay area alone.

To this contention leaders in the AFL angrily reply, since in general AF of L is "in" with Bay area shipyards and local steel and fabricating plants. "AFL workers, who are in the majority in the shipyards, have the lowest absenteeism record in the country," stated Anthony Balerini, chairman of the defense committee of the Bay Cities Metal Trades Council (AFL). He countered with the suggestion that a bottle neck on the waterfront and with warehousing and shipping was the most serious present deterent to the war effort. CIO in general controls warehouses, waterfront longshore activities and the seaman. To AFL claims that trucks (AFL) now are standing for blocks unable to get loaded or unloaded on the piers (CIO) and that only 60 out of a possible 160 work hours each week are being utilized on the waterfront, it was replied that "our men are working around the clock on the docks already work permits have been freely handed to college students and other part time workers to provide maximum manpower on the docks."

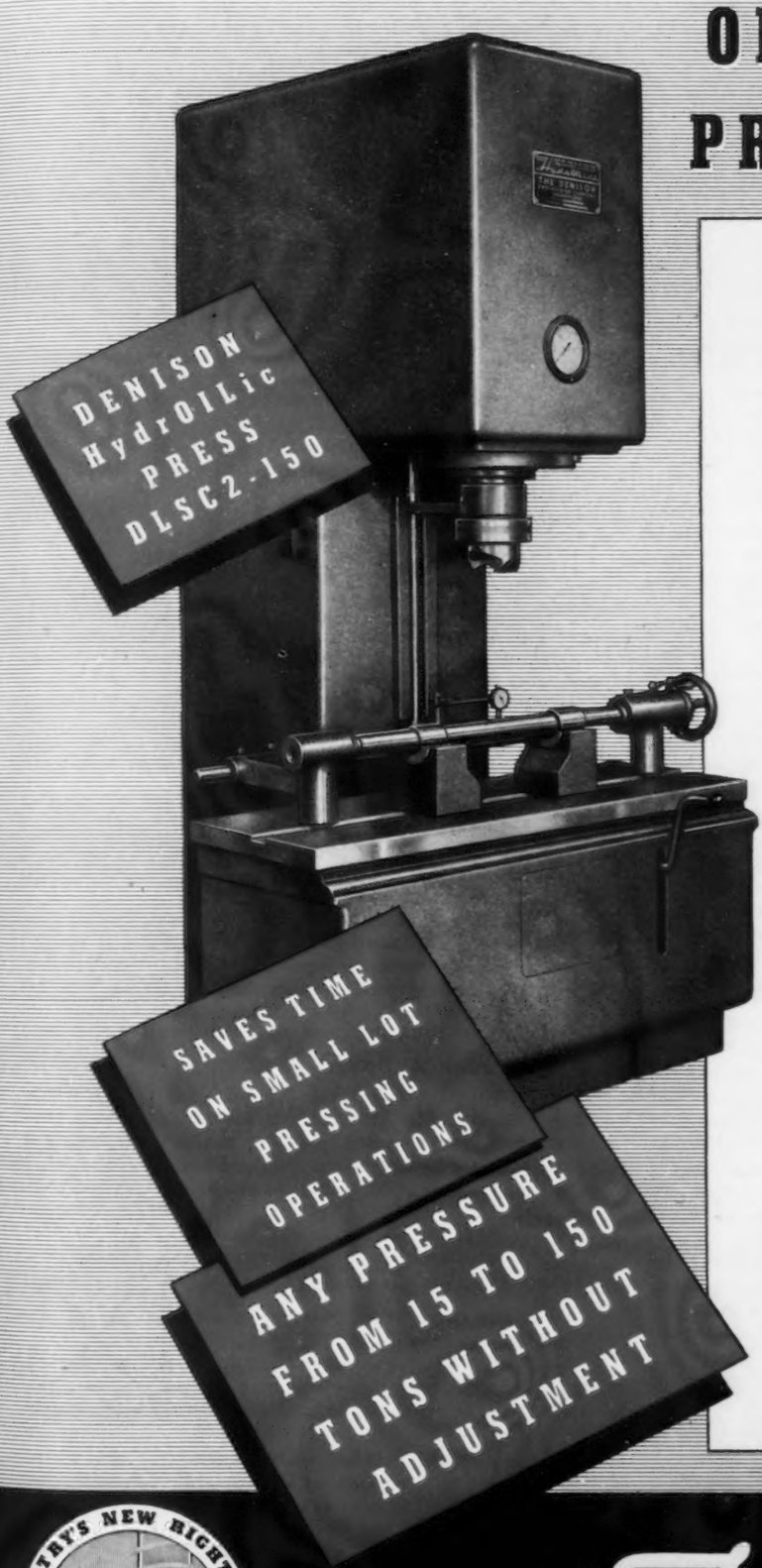
These claims and counter claims are typical, and indicative of the bitterness of feeling and competitive hostility between the two major groups in organized labor. Those in a neutral position have suggested that management itself is largely responsible for absenteeism, in imperfect indoctrination, supervision, original employee training and development of morale. If such counter attacks and jealous rivalries may be redirected to at least partial self criticism and responsible and authoritative self governing discipline, this apparent zealousness to remove both motes and beams from all others' eyes in the neighborhood should eventually result in a reduction of absenteeism and turnover and an increase in effective manhours. But only if short of actual hostilities and industrial warfare "along these lines if it takes all summer."

Institute Names Year's Bridge Design Awards

• • • **Prizes in the annual** Students' Bridge Design Competition have been awarded by the American Institute of Steel Construction as follows: First prize $200, George W. Russell; second prize $100, N. Clifford Prall; third prize $50, Curtis D. Hicks, all of Iowa State College.

The subject of the design for this year's competition was a steel grade separation bridge carrying a highway over a four-track railroad, a navigable canal, and a dual four-lane highway to which there are connections with the overhead crossing. Certificates of honorable mention were awarded to John R. Leary, Pennsylvania State College; and Charles R. Vosburg, W. David Frevert, Robert Lueder and Clarence F. Rost, all of Iowa State College.

WAR-TIME PRODUCTION SPEED ON ONE-OF-A-KIND PRESSING JOBS!



The high-speed efficiency which Denison HydrOILic Presses show on straight production-line work, can be closely approached on small-lot operations. Operating features of the new 150-ton HydrOILic Straightening Press shown here are typical . . . this press enables your operator to select the exact pressure needed for each different operation *without making adjustments* (stroke and pressure limits may be pre-set if desirable). Through a single, "feel-the-action" lever, he has full control of both movement and power of the ram at every stage of the operation . . . the pressure gauge shows him exact tonnage exerted at all times.

When the control lever is released, the ram returns immediately to full daylight opening (or to the pre-set upper stroke limit). Hydraulically held in the up position until the next operation, there's no "drift."

Like all Denison Presses, DLSC2 is fully self-contained. Yet all working parts are easily accessible. This clean-cut, compact press has rounded corners and edges for maximum safety. Ample toe space permits the operator to avoid hazardous leaning.

DLSC2 Presses are available with either hand-lever or footpedal control, or both. Working pressures range from 15 to 150 tons. Four sizes offer maximum capacities of 25, 50, 100 and 150 tons. For complete details, call your Denison representative, or write us today.

The **DENISON**
ENGINEERING COMPANY
1158 DUBLIN RD., COLUMBUS, OHIO

DENISON
EQUIPMENT *in* APPLIED
TRADE-MARK *Hydr*OILics

Fatigue Cracks BY A. H. DIX

Robin Hood Jugged

• • • You may be happy to hear that suave, well-dressed, bespectacled "A. Moore," the subscription impostor whose exploits provided us with many a paragraph, is temporarily out of circulation. This wire just came in:

ALFRED YERDEN ALIAS MOORE PLEADED GUILTY IN COURT TODAY AND SENTENCED TO 90 DAYS DETROIT HOUSE CORRECTION STOP YOUR LOCAL REPRESENTATIVE APPEARED AS WITNESS FOR STATE STOP THANKS FOR COOPERATION

PAUL H. WENCEL CHIEF OF DETECTIVES DETROIT

Yerden is the Robin Hood who transferred moneys from cash drawers of metal products manufacturers to the reticules of night club hostesses. Ohio, Michigan and western New York State were his Sherwood Forest. Starting with a modest offer of two years for $10, he worked his way up to a $55 offer, which promised practically life membership in your favorite journal's big and more or less happy family.

The immediate cause of his capture was a warning bulletin sent out by Chester O. Kahn, secretary of the Automotive Tool & Die Manufacturers Association, whose members seemed to be receiving Yerden's special attention. Among those who got the bulletin was W. J. Marron, superintendent of the Detroit Engineering & Machine Co.

When Yerden called, Mr. Marron immediately filed a complaint. Lieutenant J. V. Krug, of the Detroit detective force, completed the triple play, retiring Yerden for the duration of the cold spell.

This is a public note of thanks to Mr. Kahn, Mr. Marron, and Lieutenant Krug for quick thinking and direct action. The sad part of it is that the various state laws regard Yerden's offense in the nature of a prank, for the maximum penalty is only three months. This would be adequate for a beginner, but Yerden's experience has taught him to do an excellent lockstep, and we doubt that his brief stay in the House of Correction is causing him to say to himself, "I am sorry I sinned against society. From now on I will go straight. As soon as I get out I will get myself a job as guard in a defense plant."

Instead, Yerden is probably engaged right now in thinking up a new name for fake receipts to be printed when he gets out come next May, to take the place of those bearing the name of the now sullied Publishers Service Bureau, 847 Fifth Ave., New York.

We are asking the National Publishers Association to do what it can to induce state legislatures to move repeaters like Yerden from the wrist-slap penalty class up into the big time. But, as law mills grind slowly, this will take years. The immediate remedy is, of course, a reasonable degree of skepticism toward those who offer cut-rate subscriptions and who insist upon cash or a check made out to some individual or organization you never heard of.

Moral: Don't Drop Stop

• • • Chief Wencel's telegram, quoted above, employs the word "STOP" to denote the end of a sentence. Now that the telegraph companies permit the use of punctuation in telegrams, some people regard "STOP" as old-fashioned. But not us. The other day Frank Vanderhoff, of our field staff, called on a screw machine products maker who had received an order for a rather complicated part.

As the cost ran high, he thought it best to get an O.K. before tooling up for the job. So he wired the price and asked "SHALL WE GO AHEAD?" This screw products maker is in a small town where telegrams are telephoned instead of being delivered in person. The answer, as transcribed by the stenographer, was "NO PRICE TOO HIGH."

The parts were made and shipped. As you have already guessed, it later developed that the reply was "NO. PRICE TOO HIGH."

Stopper

• • • One false move and you're dead!—*Westinghouse*

Gold Pen Winner

So that you won't die wondering, the proper quotation is Alexander Smith's "Like a pale martyr in his shirt of fire." The bull was to print it "See the pale martyr with his shirt on fire."

As to my handwriting, I'd have you know that in school I once took a prize of a gold pen for the greatest "improvement" in penmanship during the school year.

—*John Howe Hall*

Even today our money would be on John Howe Hall in a penmanship improvement contest. The possibilities are infinite.

Usurper

Dear Deac:

On page 108 of the Feb. 11 issue you show side-by-side photographs of C. E. Wilson and Ferdinand Eberstadt, with the caption, "The Air is Cleared: It is expected at Washington that C. E. Wilson and Ferdinand Eberstadt, once having had their differences composed, will form an effective working team." This is predicting things in a wonderful way.

I enjoy your page each week.

—*T. K. Houston, General Electric Co., Schenectady, N. Y.*

Our chagrin over the fact that even the fan mail is now being addressed to our star contributor prompts the acid comment that people who remember predictions from one week to another have a sadistic streak in their make-up that should be watched.

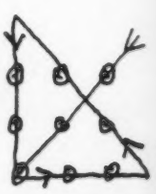
Besides, it wasn't a straight-out forecast, but contained a condition, "once having had their differences composed." That condition was not fulfilled, leaving your favorite family journal's reputation for prescience still fairly intact—in our tolerant eyes, anyway.

Paging John A. Davis

Does anyone know what company John A. Davis is president of? He wrote us for something, used a two-page form we sent out, but did not return the sheet giving the company name and address.

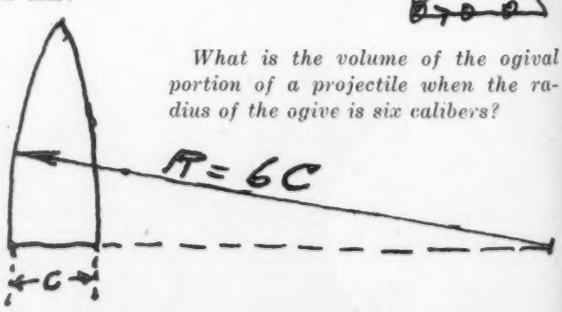
Puzzles

• • • Last week's trifle is solved thus:

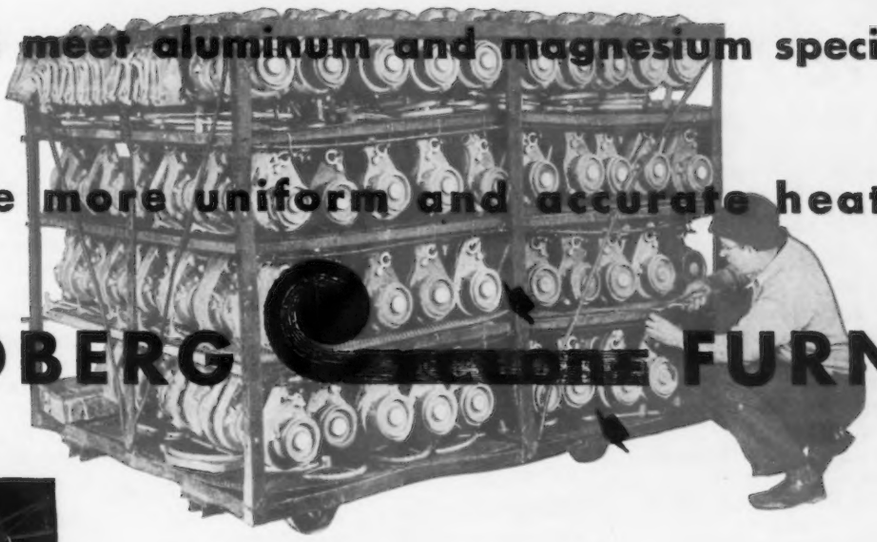


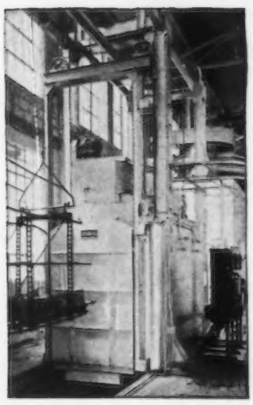
You can curse W. J. Healey, of the New York Power & Light Corp., Troy, N. Y., for the time you waste on this:

What is the volume of the ogival portion of a projectile when the radius of the ogive is six calibers?



YOU can meet aluminum and magnesium specifications with the more uniform and accurate heat of the LINDBERG CYCLONE FURNACE





Box Cyclone of the type used by all leading aircraft manufacturers for aluminum and magnesium.

HEATING UNIFORMITY

because the surface of each piece of the load is bathed in an accurately heated stream of air, driven at high velocities through the work chamber by a large, powerful, dynamically balanced fan. The heat source is isolated from the work, thus eliminating any danger of overheating caused by radiant or "one-sided" heat.

HEATING ACCURACY

because the Lindberg Control (Bulletin 42) automatically measures the input of heat to meet the demands of the load. This is especially important when heat treating the nonferrous metals where long soaking periods are required. As the load becomes saturated, its heat requirements diminish and the Lindberg Control automatically supplies only enough heat to offset the small radiation loss. Control accuracy is such that solution heat treatment and ageing are handled in the same furnace.

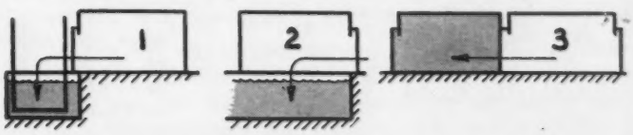
CONSTRUCTION ADVANTAGES

In addition to these heating and control features, the Cyclone is designed for long production life, safety of operation and easy access to all working parts for maintenance or replacement:

1. Heating elements and fan units are located so as to be easily accessible for maintenance or repair. Heating elements are designed for convenient removal for repair without cooling the furnace down.
2. Circulating fans are large volume type, dynamically balanced.
3. Fan is driven by motor of standard make which is replaceable by any other motor with the same nameplate rating.
4. Fan bearings are air cooled and mounted away from the furnace shell.
5. Zone heating is precision controlled to ±2.5° F. in even the largest furnaces.
6. Air operated, vertical lift doors with graphited asbestos gaskets prevent heat and air leakage.
7. The Cyclone's 50 different electric box type sizes and 22 sizes of gas fired units gives you a wide range of selection in setting up your production schedule.

QUENCHING

Cyclone furnaces are available, complete with tanks, for different methods of quenching, depending on the work being handled and the speed of quench desired:



1. Elevator quench (for castings)—rack is rolled out of furnace onto elevator which lowers work into quench.
2. Bottom quench (for stampings)—work is held in furnace heat until the bottom is moved out, then quickly lowered into quench directly below.
3. Fog quench (for stampings)—quench chamber is connected to end of furnace and houses a forced, fine spray of water into which work is drawn for quenching.

Write today for the NEW bulletin on Lindberg Furnaces for Aluminum and Magnesium Heat Treatment. Bulletin No. 140.

LINDBERG ENGINEERING COMPANY
2452 WEST HUBBARD STREET • CHICAGO

ARMY E NAVY

LINDBERG FURNACES

SUPER-CYCLONE FOR HARDENING, NORMALIZING, ANNEALING, TEMPERING
CYCLONE FOR ACCURATE, LOW-COST TEMPERING AND NITRIDING
HYDRYZING FOR SCALE-FREE AND DECARB-FREE HARDENING

Dear Editor:

REFRACTORY SERIES

Sir:

We are desirous of obtaining reprints of the following articles by J. H. Chesters, that have appeared in THE IRON AGE.

All Basic Open Hearth Furnaces, Aug. 15 and 22, 1940.

Steel Plant Refractories, Feb. 6 and 13, 1941.

Basic Open Hearth Above Sill Plate Level, May 22 and 29, 1941.

Electric Steel Plant Refractories, March 5 and 12, 1942.

Acid Open-Hearth Refractories, May 28 and June 4, 1942.

Soaking Pit and Reheating Furnace Refractories, July 16 and 23, 1942.

Acid and Basic Bessemer Refractories, Nov. 5 and 12, 1942.

Will you please give us the price of six copies of each article? If these are not available, could you tell us how much it would cost to obtain photostat negatives of these articles?

GEORGE D. RAMSAY,
Manager, Raw Materials Dept.
Kaiser Co., Inc.,
Fontana, Cal.

• Our files of back copies are skimpy. However, we are usually able to get at least one clipping of any article wanted. One set of J. H. Chesters' refractory articles has been sent you. The charge for photostats is 25¢ per page for negatives and the same price for positives.—Ed.

ABSENTEE CURE

Sir:

May I suggest a remedy for absenteeism in our factories, because it ties in with morale building, which is my job in the Navy?

If the personnel managers will work with the U. S. Employment Service and will utilize men who are discharged from the services because of being unfit for further service because of wounds, taking the trouble of fitting the job to the man and vice versa, I believe two birds can be killed with one stone. Morale will be improved, absenteeism cut down and production increased. I know of cases of this sort.

In addition to my regular duties (and they are many and various) I have been given the job of serving as Liaison Officer with the U. S. Employment Service in the matter of employment of disabled naval personnel. Men who cannot be retained on active duty for physical reasons frequently can be used in factories, either in actual production or in a supervisory capacity. It does not take a wide imagination to figure what the effect would be on our factory people to have a veteran of Guadalcanal, Wake or North Africa working with them—one who has given everything he could.

As we are not allowed to write for publication, any use you make of my suggestion must leave my name and position out. I want no personal publicity.

I feel very strongly about absenteeism and production, for on these two items hang the chances of winning this war as soon as possible. The sooner we win, the less lives will be lost.

My own company has won the Navy "E" and I want to be damned sure we continue to keep it by deserving it.

U.S.N.R.

ABSENTEE REASON

(The following letter was not addressed to THE IRON AGE, *but to* Printers' Ink. *However, we are taking the liberty of printing it because it deals with a factor often overlooked in discussions of absenteeism.)*

Sir:

I hadn't taken a day off since Christmas, so what do I do but run into the article by W. R. Heins in your Feb. 5 issue, in which he says that advertising's big job in the war is to shame workers in war plants, like myself, into putting in more hours. . . .

Practically all the men in my department are putting in just as many hours as they can. And I hear the same thing from my friends at General Electric, RCA, Bendix, and the other war plants around here. And we intend to do our damnedest in spite of the criticism of men who don't bother to check the facts. Our chief conversation is that concerning our health, so that we can stay on our jobs: how to stave off colds, get sleep, keep our bowels regular, etc. If we take time off, it's because there is a limit to human endurance. I know that this one day I'm resting will be more than compensated for in my work next week.

Just why this particular story is so popular is pretty obvious: it's a very comforting thought to a man in advertising, insurance, banking, or who runs a night club or dress factory—when he picks up the paper and reads that the villains of inadequate production are loafing war workers. Then, he can put into the back of his mind the disquieting thought that he's getting a free ride on the war effort.

If I may add my own theory to the hundreds now floating around—it's that the big trouble is there are still several million people around whose only contribution to the war effort is in telling the next person what to do.

JULES KEAN
Philadelphia

CLUTCH

Sir:

Is there any kind of a simple clutch or coupling on the market that would permit an electric motor to get up to speed before driving the driven member of a machine?

We have a 2 h.p. motor drive on a small bending machine, and would like to connect motor to machine with a coupling that would permit starting under full load.

H. E. BELLAIMEY
Detroit Tube Products,
304 S. Junction Ave.,
Detroit, Mich.

• We believe what you require is a centrifugal clutch, which will allow the motor to go up almost to full speed before engaging the driven member. Among manufacturers of such clutches are Hilliard Co., Elmira, N. Y.; Washburn Shops, Worcester, Mass.; Lovejoy Flexible Coupling Co., 5007 W. Lake St., Chicago, Ill.; and Congress Tool & Die Co., Detroit—Ed.

GLASS GAGES

Sir:

I am interested in an article by your F. J. Oliver relative to Glass Gages as developed by the Frankford Arsenal. Could I obtain about one dozen copies for distribution to different Gage Engineers at our several plants?

G. A. GARGAN
Curtiss Wright Corp.,
Propeller Division,
Caldwell, N. J.

BURN REMEDY

Sir:

On page 69 of the Feb. 11 issue, there is an article on the treatment of burns. Will you kindly advise from whom this material may be purchased.

W. WALLACE McKAIG
Cumberland Steel Co.,
Cumberland, Md.

• We believe the material is not yet in quantity production, but that some can be secured from Dr. Benjamin Levine, Mt. Sinai Hospital, Cleveland. —Ed.

SCREW MACHINE TRAINING

The editorial note on the "Dear Editor" page of Feb. 4, answering the request of H. J. Henke, of Harper-Wyman Co., Chicago, for literature on apprentice training for screw machine operators, should have mentioned an excellent series of 14 booklets by Brown & Sharpe, "Automatic Screw Machine Operation" designed especially to aid beginners. The complete set is obtainable from the Brown & Sharpe Mfg. Co., Providence, R. I., price 75¢ per set.

In addition to this series designed particularly for training purposes, Brown & Sharpe has for many years published a 335-page book entitled, "Construction and Use of Automatic Screw Machines". This includes complete instructions on setup and operation, as well as designing cams. Covers selection, sharpening and use of all commonly-used tools. Contains many useful tables and illustrations of actual jobs. Price, in paper cover, $1. It can be obtained from Brown & Sharpe.—Ed.

There Is No Substitute For *Results*

IT is a principle of logic that every "effect" must have a "cause." In judging a product (the cause), you've got to look to the results it produces (the effect) to determine its true value in relation to others in the same field. If the results are superior then it is only logical that the product, too, must be superior in construction and engineering design.

That reasoning is especially true with airless Wheelabrator blast equipment, because the results it produces are unequalled in the field of blast cleaning. A test will show why that is true.

WHEELABRATOR
The Original AIRLESS
BLAST EQUIPMENT
More than 2000 in Use

PROBLEM Cleaning 6 to 8 tons of varied size castings hourly

SOLUTION Wheelabrator Special Cabinet utilizing three Wheelabrator units

RESULT 95% of foundry's entire production cleaned in one machine

Thorough cleaning of castings weighing from one pound to one ton—approximately 95% of the production of green castings—is obtained with the Wheelabrator Special Cabinet at Spring City Foundry Co., Waukesha, Wisconsin. Nearly half the total tonnage passes through the Cabinet a second time to remove scale after heat treating.

Castings are carried into the cabinet on the mono-rail conveyor at the rate of 40 hooks per hour. Only one pass through the Cabinet is required to remove every trace of foundry sand or scale from all corners or pockets of intricate shaped castings.

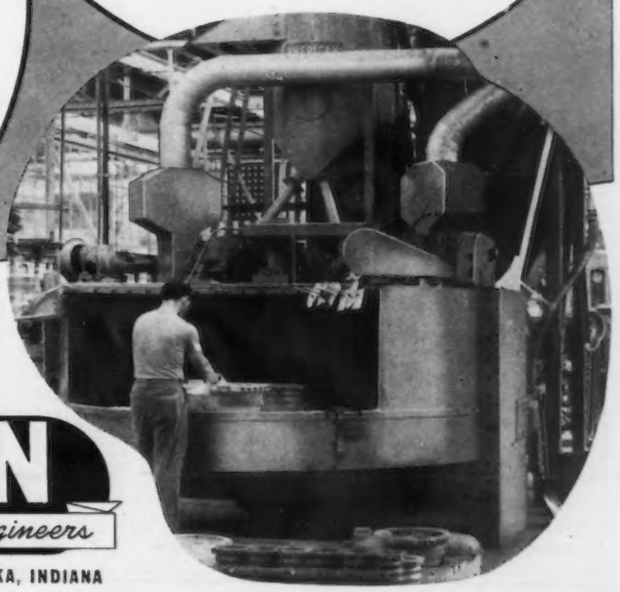
PROBLEM Speed up cleaning operations

SOLUTION Installation of a 48" x 42" Wheelabrator Tumblast

RESULT Cleaning time decreased 66⅔%

Whereas 30 minutes had been required to clean 500 pound loads of hard iron and annealed permanent mold castings with inefficient blast barrels at the Elmira Foundry Co., Elmira, N. Y., only five minutes are now needed to handle a larger quantity of the same work in the 48" x 42" Wheelabrator Tumblast.

2300 pound loads of exceptionally difficult to clean heat treated bearings are Wheelabrated in less than one-fourth of previous time necessary. Savings of several dollars per ton have also been realized due to the faster cleaning resulting.



TRADE MARK
THE AMERICAN MOLDER
REG. U. S. PAT. OFF.

AMERICAN
FOUNDRY EQUIPMENT CO.
Blast Cleaning and Dust Control Engineers

510 SOUTH BYRKIT STREET • • MISHAWAKA, INDIANA

This Industrial Week . . .

- ***Outcome of Washington Conflict Obscure***
- ***Lend-Lease Buying Expected to Gain***
- ***Nelson Knocks Props from Under WMI***
- ***Irregular Steel Buying Disclosed***
- ***Ingot Output Rises to 100 Per Cent***

SLIGHTLY higher steel production plus easier order volume may enable a temporary reduction of some steel company backlogs, but the slack is expected to be taken up quickly. According to reliable information, Lend-Lease steel orders are scheduled to be heavy during the second quarter and will involve considerable semi-finished material.

The volume of new orders in the past two weeks at some steel plants has been 8 to 15 per cent below the level in the corresponding part of January. This has not had much effect on backlogs to date, however. The decline is attributed to the more practical attitude on actual needs forced by the new Controlled Materials Plan.

In Washington gossip is as thick as a London fog as a result of the break between Donald M. Nelson and the Army and Navy. Rumors are so numerous and opinions so conflicting that veteran observers cannot appraise the probable outcome. The fight has made it possible for those favoring a "super war production board" to push their idea aggressively. Bernard M. Baruch, who directed war industries in 1918, and who has been mentioned as a possible successor to Mr. Nelson, has been closer to developments in steel and other industries in recent months than is generally appreciated.

Two recent directives issued by Nelson have almost knocked the pins out from under the ill-fated War Materials Inc., an organization created last fall to help get more scrap. By fixing a maximum of $40 a gross ton as the amount which WMI can pay for recovered scrap, the scope of WMI was greatly restricted since it had been paying considerably higher than $40 per ton for buried street car rails and other scrap.

News Highlights in This Issue

Vanquishing Off-Heats	83	Priorities News	104
CIO Tells All	84	Priority Revisions	110
Steel Expansions Lagging	86	Earnings	116
Scheduling Deliveries	89	More Steel for Gondolas	118
Flying Fortress Supreme	92	Briefly Told	119
WPB Plant Survey	96	African Ore	124
38 Smaller Plant Loans	97	Machine Tools	126
WMI Hurt by Nelson	98	Non-Ferrous Metals	128
Latest CMP Information	100	Scrap	130

SCRAP markets have been quiet recently, and some experts do not expect another tight situation until late next Fall, when additional supplies would be needed for certain new steelmaking units.

Following last week's revelation in THE IRON AGE that the government is uncovering large quantities of idle steel, the question arose as to how large inventories could be built up in view of the tight situation which has prevailed for many months. According to a regional official administering the new CMP, the switch to CMP is showing that many steel buyers weren't operating in conformity with government regulations. This would help account for at least part of the inventory material. Instead of getting under the old PRP plan (predecessor of CMP), a number of buyers ignorantly or deliberately continued operating on old preference ratings. Neither government authorities nor suppliers of steel were aware of the irregularities which occurred.

Present estimates on completion of some of the major steel expansion programs are running six months to one year behind the original schedule. Weak priorities are the cause, rather than any negligence on the part of the steel industry. The program got off to a bad start originally and finally ran headlong into urgent war requirements and manpower and material shortages. Meanwhile, much confusion has been created in the public's appreciation of the expansion program due to the fact that the original program received widespread publicity while the effect of the eliminations made last Fall was not fully appreciated.

In addition to the slowness of the expansion program, several realistic observers are understood to be expecting that necessary repairs, repairs to blast furnaces and other production units will be on a greater scale this year than in 1942. An increase in the number of blast furnaces down for repairs undoubtedly would nullify part of the gains from new stacks. It is pointed out that many furnaces have been babied abnormally pending the opening of new units.

IN the alloy steel field, at least part of the advantage obtained by the introduction of new melting facilities is threatened by an increase in off-heats at a few plants. The bad heats are caused by heavy charges of alloy scrap turnings which are now overabundant. At least one major producer has advised

customers that their favorable positions on melting schedules might not be so advantageous unless they accept higher residuals than they ordered. It was suggested strongly that the customers adopt substitute analysis or place their business on the basis of mechanical qualities rather than chemical specifications. The rise of off-heats is not industry-wide and should not occasion undue alarm at this time, but the effect on the aircraft industry's operations might constitute a threat eventually.

The problem of making use of alloy turnings is one of the most difficult which individual steel companies ever have faced. On one hand the government is exerting pressure to get the companies to use more turnings, and on the other hand certain important producers of war equipment decline to budge from their established specifications. In order to help dispose of greater quantities of alloy turnings some steel companies have been using them freely in blast furnaces.

Farm implement makers have been assisted somewhat in recent weeks by various WPB actions, one of the newest of which is permission for them to use "top cuts" as part of their increased allotment of steel for the second quarter. However, some implement makers predict they will not be able to take full advantage of the increased allocation due to the difficulty of obtaining small quantities of large rounds and alloy steel bars.

The recent action in widening the uses of concrete bars has had little significance so far, as it has not been accompanied by any increases in tonnages allotted on WPB production directives.

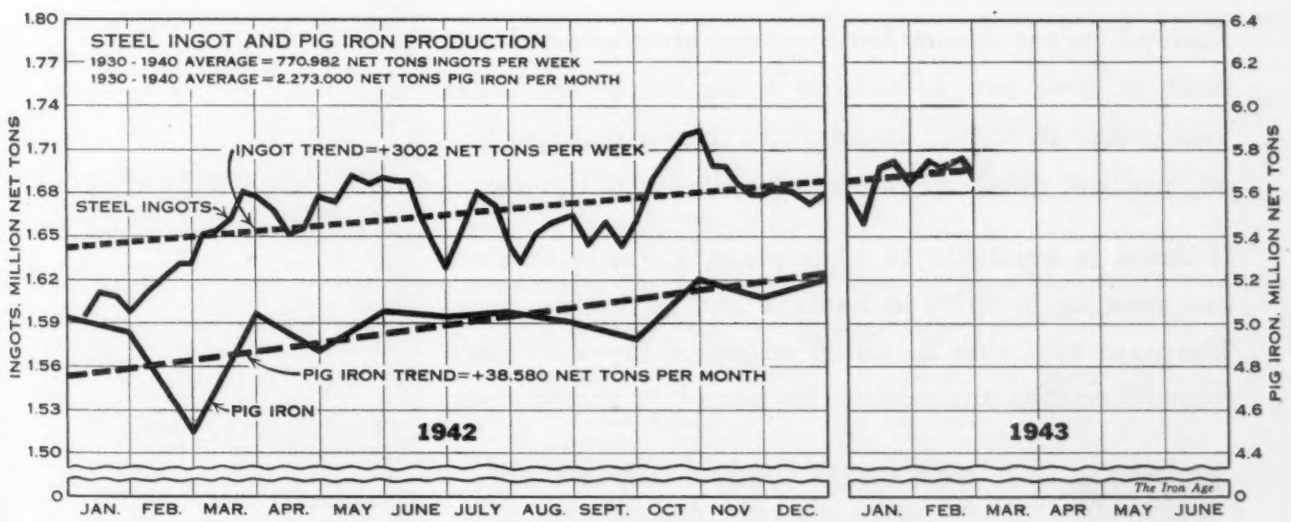
It now looks as though 20,000 railroad freight cars approved for the first six months of this year may not be completely finished until the latter part of 1943, if then. Most car building plants are pushing the production of close to 40,000 cars for the government and this will hold back the completion of domestic freight cars. It is expected by many observers that the railroads may be allowed to order around 40,000 cars for the second half of this year.

THE new pipeline from Texas to Illinois and Indiana, which would parallel the new line recently put into operation, is being strongly opposed by certain midwest refiners, supported by a powerful bloc of Senators. The line would require 160,000 tons of seamless steel pipe, production of which probably would be mostly by National Tube Co. and which would not interfere with plate production vitally needed for shipbuilding.

As in other departments of the steel industry, wire makers are being hampered severely by the lack of ample finishing facilities. The bottleneck in hot-topping equipment has hit wire divisions just as hard as other branches and the tremendous demand for spheroidized greatly exceeds the capacity of available spheroidizing equipment. Output of welding rod is climbing steadily and may hit 50,000 tons per month this year, a gain of about 5000 tons from recent monthly production levels.

NATIONAL steel ingot production this week climbed to 100 per cent of rated capacity from 99.5 the previous week. Showing a half point gain to 101.5 per cent are operations in Chicago. Philadelphia steelmaking is up one point to 93 per cent and Cleveland jumped three points to 100 per cent. Eastern district output increased four and a half points to 104.5 per cent. Pittsburgh melting continues at the same rate as last week, 101 per cent. Youngstown at 101 per cent, Buffalo at 104.5 per cent, Wheeling at 87 per cent, Birmingham at 102 per cent, Cincinnati at 105 per cent and St. Louis at 104.5 per cent remain unchanged.

o o o



Steel Ingot Production by Districts Per Cent of Capacity

Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	Cleveland	Buffalo	Wheeling	South	Detroit	S. Ohio River	West	St. Louis	East	Aggregate
February 18	101.0	101.0	101.0	92.0	97.0	104.5	87.0	102.0	103.0*	105.0	102.0	104.5	100.0	99.5
February 25	101.0	101.5	101.0	93.0	100.0	104.5	87.0	102.0	103.0	105.0	102.0	104.5	104.5	100.0

* Revised

Here's what you Get...

When You Order a PORTER Fireless

Porter Fireless Steam Locomotives are designed and built to give you something extra for every dollar you invest in them. In addition to the features listed, you get quiet operation, cleanliness and safety.

If steam is available in your plant, a Porter Fireless can save up to 50% in haulage and switching costs. They are available in direct or geared types, in sizes from 10 to 100 tons. Write for complete information.

ARMY NAVY

ONLY PORTER BUILDS A COMPLETE LINE OF LOCOMOTIVES FOR INDUSTRY

DEPENDABLE DELIVERY

You can count on the delivery promise for a Porter Fireless, since no critical materials such as diesel engines, electric motors, etc., are required.

SIMPLE OPERATION

There are no complex controls in a Porter Fireless. New, unskilled employees learn to operate and service the locomotives quickly. Porter Fireless locomotives are rugged and cannot be damaged by inexperienced operators.

LOW OPERATING AND MAINTENANCE COSTS

A Porter Fireless uses low cost steam produced in stationary boilers, for fuel. Charging can be done during idle periods. No night or week-end attendance is necessary. Fewer working parts mean fewer repairs. There is no boiler or firebox and reservoir never needs replacement.

LOW INITIAL COST

A Porter Fireless costs less than most other types of locomotives. It does not require diesel, electric or other motors. There is nothing to make initial cost high.

LONG LIFE

The first Porter Fireless was placed in service in 1914, and is still working efficiently.

PORTER better built locomotives

H. K. PORTER COMPANY, INC.
PITTSBURGH • PENNSYLVANIA

Problem of Vanquishing Off-Heats Grows More Difficult; Buyers Specify Mechanical Properties

New York

• • • Difficulty has increased recently at some (not all) steel plants in attaining the desired analysis in specific heats of alloy steel. Undue alarm is needless at the present time, authorities say. The problem can and will be overcome, but it does constitute a possible threat to war production.

Although little or no steel actually has been lost so far, one major alloy steel producer warned its customers by letter recently that their seemingly favorable positions on melting schedules are endangered because of the growth of off-heats.

The company urged the customers, who are predominantly aircraft firms, to overhaul specifications immediately because of the difficulty in holding down residuals. To date the response has been negligible.

• • • It is understood that one of the reasons prompting the steel producer to send out the letter was a series of 100 heats, 89 of which turned out poorly in respect to the analysis being aimed at in each heat.

The problem is among the most difficult which certain individual steel companies have faced. On one hand, the government is exerting pressure to get steel producers to use more alloy steel turnings scrap, which is now over-abundant. On the other hand, certain consumers, important producers of war equipment, refuse to budge from their established specifications.

Better segregation of scrap, repeatedly urged upon machine shops but infrequently adopted would be helpful in the solution of the problem. Another aid would be wider adoption of a practice which the American Iron & Steel Institute this week reports is gaining headway—the practice of ordering steel by specifying the mechanical properties desired rather than by stipulating precise chemical compositions.

Recognition of the fact that the amount of alloy steel in scrap was rising led to the change last December in NE steels in which nickel content was increased as much as 10 points. In the future it is considered possible that another revision may be advisable ultimately in order to lift molybdenum ranges. Nickel and molybdenum aren't lost to any appreciable degree in melting, considerable chrome is lost.

Alloy steel output has risen sharply, accounting for a larger share of total ingot output. The scrap coming back to the mills in the form of turnings in ever-greater quantities contains nickel and molybdenum which are hard to eliminate. Despite every known precaution, the percentages are proving too high in heats where they should be low. While the heat is still in the furnace, the customer usually is called and informed of the probable outcome. Thinking fast and being sure of the fundamentals, many customers accept the steel and compensate for the unbalance by adjusting their heat treating. If a customer insists on close analysis, the steel goes elsewhere and the original customer runs the chance of suffering a delayed delivery.

In order to help dispose of greater quantities of alloy steel turnings, some steel companies have been using them freely in blast furnaces producing steel making iron.

According to some experts, the aggregate effect on the aircraft industry ranks on a par with difficulties in scheduling and red-tape, touched on in last week's issue in "This Industrial Week."

Consumers Help Themselves to Better Service

• • • By specifying where possible the mechanical properties desired, rather than the exact chemical composition, steel consumers can help themselves to better deliveries, as outlined in the accompanying article. A further valuable aid, although perhaps more indirect, is strict segregation of scrap.

As the American Iron & Steel Institute pointed out within the past week, many wartime steel consumers already are ordering on the basis of mechanical properties. They simply specify strength or hardness required, allowing steel firms to arrange chemical composition.

The Institute predicted that the current innovation may carry into the post-war era. If it does, it will mark the third new era in steel ordering practices since the start of this century. In 1900 steel was bought on the basis of soft, medium or hard. Then came explicit chemical formulas during the first World War.

Fastidious buying in recent years grew to the point where elements were specified in hundredths and thousandths of a per cent.

For example, a certain automobile manufacturer might make five individual parts out of the same general type of steel. But the standard specification of that steel might be modified by slight alterations of the chemical content for each of the five parts, so that the permissible range of manganese or carbon or silicon varied by small percentages. In effect, five different steels had to be produced.

United Steelworkers—CIO Tell All; Reveal Dues, Salaries, Fees, Expenses

Pittsburgh

• • • **Where the** United Steelworkers of America, CIO affiliate, get their money and what they do with it, is no longer a mystery to the steel industry or the public in general.

In one of the most complete and comprehensive audit reports presented by a union, the USWA has told such things as—its resources and liabilities, its income and expense, a detailed statement of initiation fees, dues, and refunds by districts, a statement of international office expense, and even down to an account of fees and dues by local unions for the period May 1 to Nov. 30, 1942. The union's books were audited by the well-known firm of Main & Co., who perform like duties for industrial concerns.

In an introduction to the report, Philip Murray and his assistants point out that the USWA has a total of 1800 local unions, with a total membership of 725,625. Probably somewhere from 15 to 20 per cent of this membership is now in the armed forces, and although not paying dues, are carried on the books as members in good standing.

UNITED STEELWORKERS OF AMERICA

Statement No. 3

Summary Statement of Initiation Fees, Dues, and Per Capita Refunds, by Districts May 1 to November 30, 1942

	DISTRICT	Receipts		Per Capita Refunds	
		Initiation Fees	Dues	Initiation Fees	Dues
1	New England	$ 6,722.00	$ 62,318.50	$ 2,240.67	$ 15,828.91
2	New York City	21,881.00	74,837.00	7,293.69	18,583.00
3	Utica, N. Y.	8,524.00	46,993.00	2,841.33	11,859.50
4	Buffalo, N. Y.	18,442.00	122,110.00	6,147.34	30,524.75
5	Eastern Canada	.....	41,275.56	.....	10,318.90
6	Central and Western Canada	6,291.00	53,544.50	2,085.00	13,142.38
7	Philadelphia	24,199.00	138,246.50	8,068.35	34,630.00
8	Baltimore	8,269.00	33,724.00	2,756.33	8,839.75
9	Bethlehem, Pa.	7,725.00	37,764.00	2,477.32	9,370.75
10	Wilkes-Barre	6,340.00	45,797.00	2,113.35	11,449.25
11	Harrisburg	4,121.00	76,713.50	1,369.66	19,006.75
12	Johnstown, Pa.	2,951.00	54,566.75	984.42	13,641.69
13	Charleroi-Monessen	6,308.00	101,166.00	2,111.67	25,291.75
14	McKeesport	1,812.00	47,789.58	603.99	11,947.40
15	Homestead	27,115.00	108,902.75	15,869.34	27,970.44
16	South Side-Hazelwood	8,076.50	52,252.00	3,846.48	13,237.83
17	Lawrenceville-North Side	5,824.50	50,335.50	1,923.48	12,601.88
18	McKees Rocks	6,222.00	44,729.50	2,074.00	11,247.13
19	Tarentum	9,887.00	142,240.00	3,299.77	35,621.00
20	Ambridge	20,201.00	140,633.00	6,733.64	35,255.55
21	Sharon	8,966.00	86,820.10	2,985.33	21,757.48
22	Charleston, W. Va.	583.00	17,670.00	194.33	4,417.50
23	Steubenville-Wheeling	19,255.50	92,973.71	6,418.50	23,290.73
24	Columbus	4,142.00	32,173.35	1,380.68	8,592.75
25	Cincinnati	3,218.00	36,153.50	1,071.67	8,767.01
26	Youngstown	5,595.50	145,446.50	1,865.14	37,252.88
27	Canton	3,693.00	104,721.00	1,067.33	27,220.75
28	Cleveland	14,256.00	169,831.50	4,510.32	45,758.85
29	Detroit	10,749.00	74,977.32	3,582.99	19,183.33
30	Indianapolis	10,667.00	82,945.23	3,554.68	20,911.20
31	Calumet	35,063.00	383,224.85	14,359.67	100,033.44
32	Milwaukee	14,634.00	106,270.65	4,878.03	26,715.25
33	Minnesota and Iron Ranges	12,195.00	71,747.75	4,049.91	18,232.61
34	St. Louis	20,285.00	103,150.50	6,679.65	27,508.73
35	Southeastern	406.00	4,503.25	135.33	1,125.81
36	Southern	12,723.75	45,981.60	5,133.72	12,819.27
37	Texas	320.00	14,580.50	106.67	4,180.87
38	West Coast	16,127.75	97,880.25	5,375.92	25,762.54
39	Utah	278.50	3,763.50	92.83	957.00
	Sundry Unchartered	.....	120.00	.....	.....
	TOTALS	$394,069.00	$3,150,873.70	$142,282.53	$804,856.61

-16-

On Nov. 30, 1942, the union (which was organized as the SWOC, June 17, 1936) had money in the bank and other assets totalling $1,931,195, with current debts amounting to $156,290. This gave the union a net worth at that time of $1,744,905.

From the period May 1 to Nov. 30, 1942, the union collected $3,552,342 from initiation fees, dues, and other sources and refunded to the local unions the sum of $947,139. A total of $2,304,015 was expended during those seven months for the operation of the international and district offices, leaving an excess of income over expense amounting to $301,188. Phil Murray points out that the net worth of the USWA was further increased by a cancellation of $960,000, which represented certain advances made previously by the CIO.

The regularly employed personnel of the districts of the USWA numbered 561 persons. During the seven-months period covered by the report, 2068 members of local unions were occasionally employed to serve on committees engaged in wage scale and other conferences. These people were brought to such conferences as representatives of the rank and file and their expenses of attending such meetings were borne by the union.

An analysis of the total dues received from members during the seven-month period and which amounted to $3,150,874 indicates an average of more than 450,000 paid-up members during that seven-month period. The deficiency between this number and the total membership of 725,625 given by Murray as of Jan. 15, 1943, is probably due to one or all of the following reasons, some dues were apparently waived during a campaign for members, thousands of members had apparently gone to the armed forces, a considerable increase in membership due to maintenance of membership clause probably occurred between November and January, and a percentage of members during May and the time the maintenance of membership went into effect probably let their dues slide.

Initiation fees during the seven-month period, which amounted to $394,069, indicates that approximately 131,000 new members were obtained during that period, although it was probably higher than this due to the waiving of some initiation fees during campaign drives. The initiation fee is $3.00 and dues average $1.00 a month. Approximately 25 per cent of the dues collected and one-third of the

initiation fee is returned by the international office to the locals for the maintenance of the latter.

On the much debated question of union salaries and travel expense, the audit shows for the district offices a total of $804,852 for salaries and wages of the regular personnel and a travel and per diem expense for the same group of $360,746, with a total of 561 regular personnel. This figures to an average of approximately $205 a month for salary for a district employee, and an average of $92 a month per district employee for traveling and expenses.

An analysis of major expenses of the international office discloses a per capita tax paid to the CIO of $179,213, compared with a total income during the period of $2,605,203, which does not include per capita refunds to the locals. Negotiation and wage conferences during that seven months were shown to have cost $61,306 and conventions $16,866.

Salaries to four international officers during the seven-month period amounted to $30,250. General office employees, numbering 44, received $56,803 during the same period; a legal staff of three received a total of $7,488; publicity staff of four received $8854 for the seven months; and a research staff of seven were paid $11,473.

The cost of "steel labor publication" during the seven-month period was set at $70,999, while travel expense for the international office was listed as $42,793. An international organizing expense for the seven months was shown as $26,050. A legal office expense is indicated as $14,474; a publicity office expense of $10,482; and a research office expense of $10,260—all for a seven-month period, and probably involving any extra expense over and above salaries and traveling as a result of the operations of these three departments. The total expense for the international office from May 1 to Nov. 30, 1942, amounted to $730,761.

Since the union has obtained a fairly uniform maintenance of membership clause in the steel industry, and since this was not fully operative until last August or September, the six or seven-month period to be reported next will probably show a considerable increase in the amount of dues and initiation fees received. The steelworkers' union report presents such a breakdown in union receipts and expenditures that it is difficult to compare it with most industrial audits on the same basis.

• • • We can't tell you much—we can't picture accurately, the design and synchronization of Lamson Ammunition Conveyors and Hoists being built for U. S. War Vessels—but we can tell you that they're fast and are helping to raise the firing rate to gun-capacity!

Lamson Conveyors and Lamson Dispatch Tubes are not only serving our Army and our Navy—they're also expediting the production of arms, aircraft, and munitions in the Nation's biggest War plants . . . where secure, efficient movement of material and necessary paper work is so vital.

LAMSON CORPORATION

Dept. IA-2, — Syracuse, N. Y.

Makers of CONVEYORS and PNEUMATIC DISPATCH TUBES

Steel Expansions Lagging Badly; Most of Blame Put on Weak Priorities

Pittsburgh

• • • **Present estimates** on completion on some of the major steel expansion projects are running six months to one year behind the original schedule. Despite high-sounding pronouncements from governmental authorities, only partial operation of some of the more important projects is expected before the fall of this year. Some of the holdups involve urgently needed electric alloy steels.

Due to political expediency, or based on half truths, the steel industry may wind up as the "goat" for the current mess, but the real culprit will be the priorities setup, which fortunately will soon be superseded by the CMP. So many factors are involved in the retardation and useless delays that no individual or group of people could be expected to take the blame.

The initial fault apparently lies with those in the governmental agencies who lacked sufficient knowledge in the beginning to properly plan the flow of materials on the basis that super-ratings be granted such expansions more than a year and a half ago. At that time, the United States was not yet at war and hard-headed steel operators warned that if the government expected a rapid expansion in steel facilities, these must, due to their nature, be placed ahead of practically everything else and on a par with the most urgent lend-lease and defense requirements.

It is no answer to these delays for governmental agencies to talk about manpower and material shortages. Had the shortcomings of the priority system been recognized early enough, special provisions could have been made to see that the steel expansion program was given special privileges. This was not done in 1941, or in early 1942, so that by the time the seriousness of the situation was realized, manpower and material shortages had begun to neutralize effectively the entire priority setup.

On the basis of these observations, the continual attempt to place the blame for alleged steel shortges and slowdowns in steel expansion projects against the steel industry seems to be without foundation. Lack of coordination in granting the proper preference ratings is the primary cause of the present situation. However, a feeble attempt to name all the factors involved in the holdups on steel expansions is as follows—weakness in the WPB priorities setup, jurisdictional labor disputes, manpower shortage resulting in inefficient help, growing material shortages, the unbelievable amount of red tape involved, and the total lack of experience on the part of some engineering firms and governmental agencies involved in the various projects.

Not so many months ago, Donald Nelson ditched many projects, among them some steel expansion plants, which at that time were not believed to be advanced sufficiently in formulation or construction to be completed by the middle of 1943. If the total steel capacity of the United States at the end of this year is anywhere near the WPB estimates, it will not be because of brand new capacity, but it will be due to an all-out effort on the part of the steel industry to get more and more out of existing equipment by establishing unbelievably high records.

Wide World

MAN BEHIND "CHANITE": Adolf Chanosky, Fort Worth, Tex., engineer, who is credited with the development of "Chanite" which is used in cutting tools. It is said that Chanite's best method of application is as a tipped tool brazed or welded on a medium carbon steel tool holder. Heat treatment is said to be unnecessary.

One large steel plant expansion in the Pittsburgh district, which originally was estimated to be completed early this year, and which later was estimated to be completed by the middle of this year, may have no more than one-third of its open hearths in operation by July 1. Incidentally, this project is considered to be vital in the manufacture of certain important war steel requirements. It is believed that at least a third or more of this project's open hearth furnaces will not be in operation until next January or February. The sad truth of this situation is not that the larger parts of the project are not completed and ready to operate, but rather because certain small components have been lost in the maze of priority difficulties. Figuratively speaking, a few small parts of the entire program and the inability to obtain them has neutralized many of the more important parts of the installation.

Two major electric steel programs in the Chicago district are far behind schedule, although important parts of these programs are already installed, but cannot be utilized because of lack of other materials. One of these projects, which involves nine electric furnaces and four tilting open hearths, originally scheduled to be in operation by the fall of 1942, probably will not be in complete production before the fall of this year It is expected, however, that two units out of nine may be melting electric steel on cold charges by May.

Another project in the same district, which was scheduled to be in operation by the end of 1942, will not see production much before July, 1943. In both of these cases, as in most of the others, furnaces have been ready, but electrical and other equipment was late. If furnaces and electric equipment were ready, the steel to make pouring platforms or buildings was unavailable. If the plans were all drawn and the work partially started, it was not unusual to see a redesigning of plans to save steel which took enough time that, had the original plans been adhered to, five or ten times the amount of steel would be produced than was theoretically saved.

It is true that in many instances, material needed for the completion of steel expansion programs was knocked off rolling mills by the urgent necessity of getting out Army and Navy

Ramparts of Production

With Continental it is not "too little and too late."

One reason for this is the spirit and the hard work poured into arms production by our men and women. Into this tremendous task Continental has thrown every ounce of heart and strength.

Together, for the past year, Continental men and machines, working three shifts, seven days a week, have manned tirelessly the Ramparts of Production. We feel a patriotic pride in new production records set, and are deeply grateful for recognition given us by the Army and Navy. Another year begins with every man and woman of Continental determined to surpass past records in the production of quality war equipment for the fighting men who inspire our efforts.

* * *

Continental products include carbon and alloy steel castings, armor castings, rolls, rolling mill equipment, and special machinery of many types.

CONTINENTAL

ROLL AND STEEL FOUNDRY COMPANY

CHICAGO • PITTSBURGH

METAL SPECIALTY

Fulfilling exacting requirements for leading industries everywhere in

PLASTIC MOLDING

•

DRAWING · COINING · STAMPING
ROLLING · FORMING · WELDING

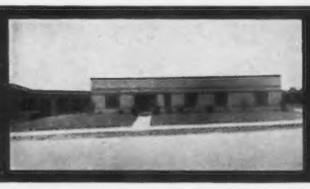
Metal Specialty's plants are equipped to render you complete service in the fabrication of all metal parts, and in plastic injection molding up through 18 ounces per shot. Along with 850-ton self-contained hydraulic presses for metal working, Metal Specialty has one of the four 18-36-ounce capacity injection presses for custom molding together with full complementary equipment.

ASSEMBLED JOBS

PRESSED METAL TO ORDER

THE PLANT AT CINCINNATI, OHIO

THE PLANT AT RICHMOND, IND.



The
METAL SPECIALTY Co.
MAIN OFFICE AND PLANT • ESTE AVENUE • CINCINNATI, OHIO

requirements. While this appears as a legitimate excuse, it could and has been used so often, that even the latest estimates may be as far off as the original ones.

Meanwhile the manpower situation has become so acute that by the time many of these units are completed, it may be difficult to get the right people to run them, let alone keep the necessary labor to complete the installations. Aside from those difficulties, shortages of various materials are mounting so rapidly that it would not be unusual to find in a few months the holding up of some programs which are ready to operate, but which lack one or two small items that cannot be obtained no matter what effort is expended.

The entire steel expansion boils down to the fact that it got off to a bad start due to lack of proper priority planning, got further behind as time went on, and finally ran headlong into urgent war requirements, and manpower and material shortages. Valuable time was spent on red tape attempting to secure higher ratings on certain components when they should have had such ratings in the first place. After weeks or months of arguing for a desired rating, it was not unusual to find that the new one was obsolete and a higher one was necessary. The steel industry had no control whatsoever over the allocation of materials for the completion of steel expansion program, and probably the only reason why the blast furnace situation is in much better shape than the steel expansion programs, is because it was expedited much earlier than the steel programs were started, and was not as involved.

Segregation of 2 Aluminum Alloys Being Pushed Diligently

• • • **Segregation of** the Aluminum alloys X76S and XA75S, containing zinc, is being pursued aggressively. The Aluminum and Magnesium Division of WPB recently announced that a single dealer in the town in which the scrap is generated will be designated by the division as the sole avenue of disposal of the scrap in his vicinity. Any person, including the designated dealer, who acquires any scrap of these alloys is requested to dispose of it only to Samuel Greenfield Co., Inc., Buffalo, if generated east of the Pennsylvania-Ohio line, or to Aluminum & Magnesium Inc., Sandusky, Ohio, if generated west of that line.

Scheduling of Ordnance Deliveries Comes Within 15% Of 1942 Forecast

• • • **Deliveries of** ordnance items during the calendar year 1942 were within 15 per cent of the overall forecast on the $54 billion program, according to Brig. Gen. H. F. Safford, chief of Army Ordnance production service, addressing the SAE in Washington last week.

He presented a number of performance reports praising the new howitzer motor carriage, the multiple gun motor carriage and the destruction created by small calibre automatic anti-aircraft weapons.

"And what about the ammunition for these weapons," he said. "It must pass the most rigid inspection of dimensions and metallurgical perfection. When billions of rounds of ammunition are being produced, there are small quantities which are determined. upon inspection, to be sub-standard for one reason or another. Such ammunition may not be usable, in which case it is rejected and the component parts salvaged. On the other hand, it may be more suitable than perfect ammunition for training purposes. The reason for this is simple. In training it is necessary to simulate all conditions which may be encountered in the field. With imperfect ammunition, stoppages and jams are encountered in the use of automatic weapons. The soldier is therefore trained to take prompt corrective measures when stoppages occur.

Another obvious advantage with the use of sub-standard ammunition for training purposes is the economy in cost, man hours and material. Only ammunition which has successfully passed all tests is issued to combat troops, and only specially selected ammunition is used in aircraft machine guns.

"Our armor piercing, tracer and incendiary bullets in the .50 cal. aircraft machine guns literally tear the enemy ships apart in the air. They are responsible for the feats of many aces."

Suggestions from ordnance manufacturers have brought many worthwhile ideas, said Brig. Gen. Safford. Over 250 have been accepted and put to use. Among the examples he cited were the following:

An adapter booster, used in artillery ammunition, weighing only a few ounces, was formerly manufactured from bar stock on automatic screw machines. This was changed to pressed steel, with the resultant saving on a single order of 210,000 man hours and enough steel to produce 3000 one-ton bombs.

Two million fin lock nuts were changed from forgings to stampings, saving 100,000 machine hours, much steel and $283,000.

Foundrymen Discuss War Operating Practices

Milwaukee

• • • One of the outstanding production conferences of the war was held here last week when 500 foundrymen from Wisconsin, Indiana, Illinois and nearby states gathered for the sixth annual foundry conference held under the joint sponsorship of the Wisconsin chapter of AFA and the University of Wisconsin.

Dr. C. A. Dykstra, president of the University of Wisconsin, set the pace for the conference. The meetings covered such subjects as the use of boron in castings, centrifugal casting, feeding steel castings, conservation of refractories, salvaging bronze castings, sand control, heat treatment of cast iron, converter steel and silicon bronzes. Two symposiums, one covering malleable iron and the other patterns attracted wide attendance. One of the outstanding characteristics of the conference was the complete lack of secrecy in discussions of what before the war were considered trade secrets.

The increasing use of malleable in ordnance work, including its use as a replacement for aluminum parts, was of unusual interest. Maritime officials as well as ordnance men have found that the shock which a ship or a tank must withstand as the result of a near miss is much greater than had been originally anticipated and many parts are being converted to malleable in order to withstand this shock without breaking.

During the discussion of boron it was reported that two foundries in Detroit, five in Pittsburgh, 10 in Chicago and four in Milwaukee were now using boron. Better machinability and smaller alloy needs were listed as the chief reasons for the growing use of boron.

MORE STEEL AND

LESS COST WITH SALEM

AN INGOT HEATING FURNACE, NOT JUST ANOTHER SOAKING PIT

Salem Soaking Pits, unlike all others, are in principle and practice INGOT HEATING FURNACES, and have a circular shape. Operating men generally accept the fact that the most important requirement for proper rolling of steel is TEMPERATURE UNIFORMITY. It has been proven by actual tests that Salem circular pits maintain A MORE UNIFORM TEMPERATURE FROM TOP TO BOTTOM than do the pits of other designs. It is not surprising, therefore, that years of production data on Salem Circular Ingot Furnaces reveal new production achievements that include increased tonnage, better quality, and lower costs.

IT WILL DO MORE

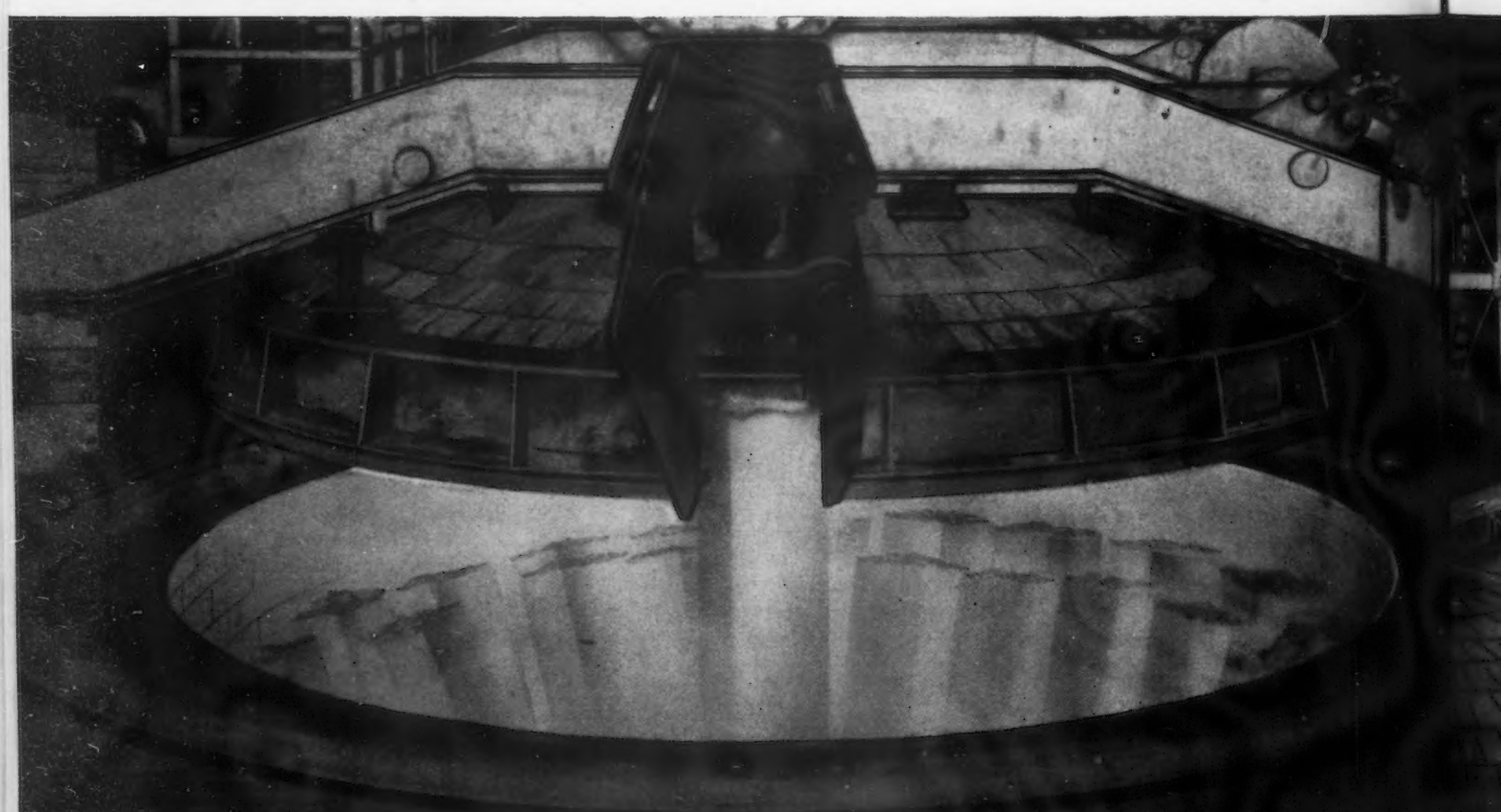
Twenty-five percent faster cycle than with other types of soaking pits—that's the result of heating cold or hot carbon steel, or alloy ingots in Salem Circular Soaking Pits. There's no better method, especially for alloy steel since the empty pit may be quickly cooled to the proper temperature for charging. Having accurately controlled temperature—as accurate as any heat treating furnace—Salem equipment heats ingots uniformly from top to bottom. Better yet, all the ingots in a charge and in each subsequent load have the same temperature. This permits faster, safer rolling, plus steel with better surface. And best of all, since Salem Pits are circular, thus having NO FORGOTTEN CORNERS, they will heat more ingots more uniformly per square foot of occupied floor space than square or rectangular pits.

FOR EXAMPLE: The heating rate for a 16 foot Salem Furnace is about 15 tons per hour with cold steel, and as high as 38 tons per hour with hot steel. One case shows where nine cold ingots, each weighing 26,000 pounds, a TOTAL OF 234,000 POUNDS IN ONE 16 FOOT HOLE, are uniformly heated from cold to rolling temperature of 2450° F. in 7 hours, 15 minutes. Furthermore, the scale is unbroken and the ingots are in excellent condition for rolling. THAT IS NOT ALL—in comparison with the results of using the regenerative practice, it is found that edge cracking from overheating is about 40% less with Salem Pits. Hence, the savings in chipping costs are enough to pay for the entire fuel consumption of Salem Ingot Heating Furnaces.

SAVINGS—Salem's accurate control of ingot temperatures eliminates all guesswork, thus permitting a minimum thickness, single jacket scale formation. Thus, Salem Ingot Heating Furnaces reduce the scale formation by at least 1%. In addition to this scale saving by superior heating, the yield also increases as much as 1%. Therefore, Salem Circular Furnaces provide savings through faster production in less space, more uniform quality, better rolling, better finish, higher yield, and lower costs.

INGENIOUS DESIGNING

Since Salem Pits are circular in shape, there are NO



SALEM ENGINEERING C

BETTER STEEL AT

CIRCULAR SOAKING PITS

COLD POCKETS and NO FORGOTTEN CORNERS. A multiplicity of burners is placed outside the furnace near the bottom for accessibility, and heat from them enters the combustion rim at a tangent to the circular furnace wall. This method avoids direct impingement on either the ingot or the furnace lining. The active heating gases move in a spiral path as a result of the circular shape of the pits as well as the tangent method of directing the heat into the chamber. Hence, the hot gases are in contact with the ingots longer than in any other type of pit and with relatively low burner velocities. Furthermore, brickwork maintenance is kept to a minimum due to this method of firing and circulation whereby there's no direct impingement. This firing method also provides for better combustion.

The circular design of Salem Pits materially aids the maintenance of accurate temperature. Salem engineers go still further by adding the same control equipment as that used on outstanding heat treating furnaces: pressure, temperature, and combustion control mechanisms. Hence, circular pits plus heat treating furnace controls, give DOUBLE assurance of heat uniformity at all times. Another advantage lies in the fact that in circular furnaces, only a single thermocouple is required instead of a multiple of them as are found in square type pits.

Salem Circular Ingot Heating Furnaces, with all these worth-while advantages, are built in various sizes to meet any production or building requirement. Remember please, they utilize less space for a given tonnage, and in addition to giving 25% increased production plus greater yield with lower maintenance cost, they also show other big savings.

ADVANTAGES FROM SALEM'S EXPERIENCE

During the designing of Salem Soaking Pits, our engineers were striving for an efficient production method which would give comparable performance to that obtainable from heat treating furnaces. With Salem's broad experience in building furnaces of all kinds as well as steel mill equipment, it is not surprising that its engineers designed and built circular soaking pits that are right now delivering outstanding performance. It is also noteworthy that the world's largest ingot heating furnace was built by Salem. Since experience became the basis for Salem design, and since the design and construction have been substantiated by actual performance records in EVERY Salem installation, you can't go wrong by selecting them. Salem Ingot Furnaces GIVE YOU SIXTEEN DECIDED ADVANTAGES: higher production in a given area, higher heating rate, remarkable heat uniformity, better rolling, better steel, less scale, less chipping, 1% higher yield, a very minimum of cinder, less fuel consumption, no flame impingement on ingots or the furnace wall, no washing of ingots, less maintenance, lower fuel expense, foolproof cover for greater safety, and lower over-all production costs. Here's THE solution to one of your war production problems.

GCO. . . . SALEM, OHIO

Ball Turret and Firepower Help Make Flying Fortress Supreme Weapon

New York

• • • **What does** a seasoned and influential English aviation expert think of the Flying Fortress? After a minute inspection and a flight in the American bomber, which has confounded friend and foe through its ability to take terrific punishment in the air over Europe and still remain aloft, Peter G. Masefield, technical editor of *The Aeroplane*, says that an unsurpassed ball turret, plus great firepower (in which the ship's deadly rear guns play an important part) plus superior high-flying qualities make the Flying Fortress a powerful weapon.

The pilots flying these super planes are proud of the performance of the Fortress. In comparison with the English Lancaster, a plane used for the same type of daylight operations in which the requirements of speed, load, height and defensive powers are identical, the two come out fairly even. Broken down to direct comparison, the Fortress has approximately four times the hitting power for the same all-round field of fire. Cruising speeds are identical, although the Lancaster is slightly ahead when operating with full load and armament. Bomb carrying capacity of the Lancaster is three times that of the Fortress, but the latter has an operational height with full load of about 10,000 ft. higher than that of the Lancaster under similar conditions. On maximum range with bombs the Lancaster comes out first, and it has tanks for 2600 gal. of fuel against 1762 gal. fuel capacity for the Fortress. By the installation of extra tanks in the bomb bay, however, the Fortress can take a maximum of 2500 gal. when not loaded with bombs.

Much can be said in favor of the armament or defense of the Fortress, particularly in regard to the ball turret. This turret is slung on a bracket from the roof of the fuselage and projects about one-third of its diameter through the floor. It is mounted so that it can swing in any direction. In fact, after fierce action of rolling, turning, rotating and spinning, ball turret gunners have been known to completely lose their sense of position and be unaware of which way they are facing, or if they are right side up or upside down! To counteract this, stripes have been painted on the starboard wing of the Fortress for these gunners to use as a guide.

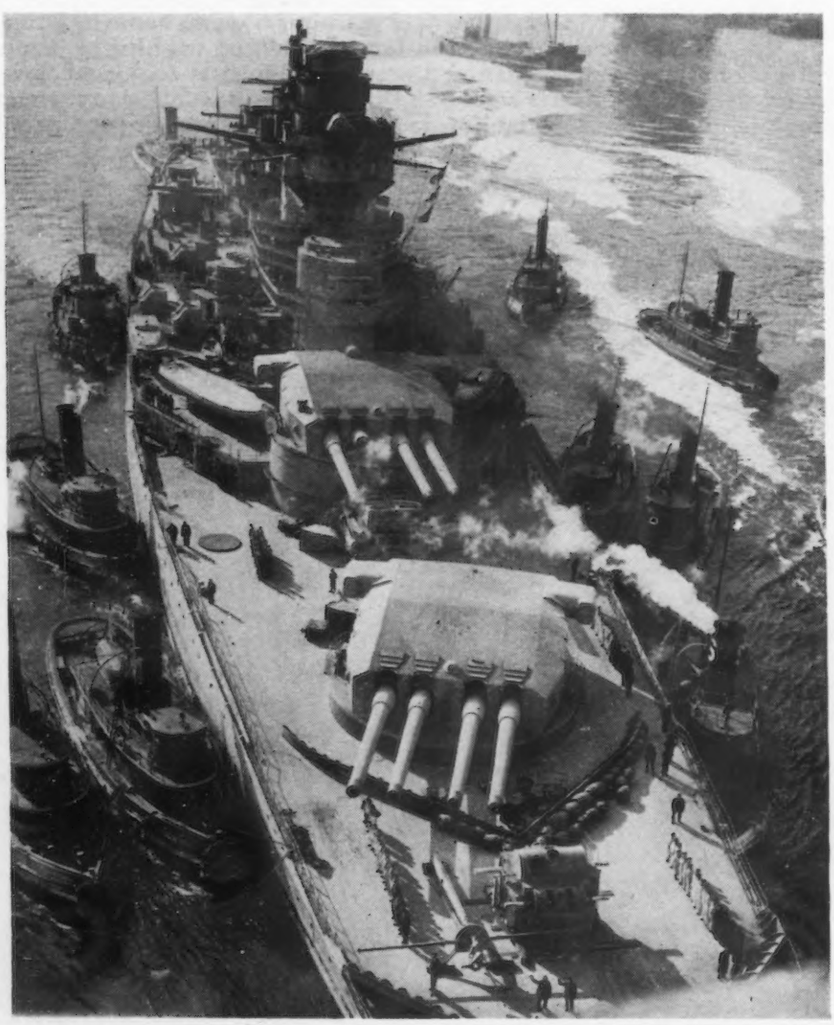
Twelve guns of 0.50 in. calibre and one gun of 0.300 in. calibre comprise the hitting power of the Fortress which works out to approximately 1,990,000 ft.-lb. per sec. which is equal to 3620 hp. The maximum weight of fire is 1185 lb. per min. which is a good deal greater than the combined fire powers of any other plane built today.

Masefield brings out an interesting point when he cites the "Pursuit Effect" of the rearward firing guns. A fighter hit when attacking from the rear breaks up almost invariably, he says.

Enemy fighters have come to dread the rear fighting guns on this great American bomber. Attacking from the rear has proved fatal to them in almost all instances. Changing their fighting tactics, the Germans have adopted the idea of head-on attacks which are not too successful because the method of approach reduces the time for aiming accurately. The success of American formation fighting, in which cross fire from several bombers is used effectively, has caused the Germans to stand off in the hope of crippling a bomber, causing it to fall out of the formation, whereupon the entire German unit attack it.

FRENCH BATTLEWAGON HERE: This is the "Richelieu," 35,000-ton French battleship, in New York Harbor. A gun is missing from the second turret as a result of British naval action at Dakar.

Wide World



55,000 Employees at War

New York

• • • **More than 55,000** employees of United States Steel Corp. and subsidiary companies, the equivalent of nearly four full Army divisions, are serving in the military forces of the United Nations.

Now Unfurled above our plant to mark the achievement of THOSE WHO WORK "BEHIND THE LINES"

The patriotic zeal of the men and women workers of Acme is symbolized by the Army-Navy "E" awarded for outstanding achievement in the production of war materials. Acme workers share with all Americans a stirring pride in the valorous action of our boys on the fighting fronts. Here at Acme we fully realize that the future of our families, our homes, our country depends upon the boys at the front and our ability to give them the weapons and equipment they must have. Among them are our husbands, brothers, sons. We will not let them down! We are proud of the "E" Emblem on our lapels, as a decoration for past production achievements. We accept it as a compelling challenge to even greater production in the days that lie before us.

For VICTORY buy WAR BONDS and STAMPS

Acme for Action!

ACME PATTERN & TOOL COMPANY INC., DAYTON • OHIO

Heat-Treated Aluminum Aircraft Castings • Patterns • Tools • Tool Designing • Production Processing

Metallurgists of 3 Nations Will Meet to Map Alloy Savings

Washington

• • • **Particular emphasis** will be placed on the conservation of alloying metals in the course of comprehensive discussions of metallurgical problems of the British, Canadian and American steel industries at meetings scheduled to begin early in March, it was announced last Thursday by WPB. Participating in the meetings will be a nine-man metallurgical mission of the British Iron and Steel Control, three Canadian representatives, and a 13-man American Committee, the latter appointed by WPB Steel Division Director H. G. Batcheller and headed by Vice-President Quincy Bent of the Bethlehem Steel Co.

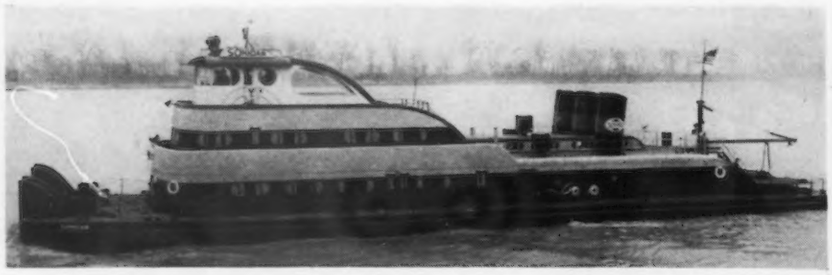
As a basis for possible recommendations to the proper agencies of each Government, it was announced, the combined group will discuss the production of alloy steel ingots, and the use of virgin alloying metals for many products. It is expected that statistical data will be presented covering alloy steel scrap consumption; the percentage of various critical alloy steel scrap consumption; the percentage of various critical alloys charged in virgin form; the monthly consumption of all alloys in relation to alloy steel output and the monthly production of alloy steels in the main analysis categories.

In addition to Mr. Bent members of the American committee are:

Dr. H. J. French, chief of the Metallurgical and Conservation Branch of the WPB Steel Division; Howard Young, director of the WPB Minerals Resources Coordinating Division; Dr. G. B. Waterhouse, of the Office of Lend-Lease Administration; Earle Smith, chief metallurgist of Republic Steel Corp. (alloys); A. D. Shankland, chief metallurgist of Bethlehem Steel Co. (shot and bombs); John Mitchell, Carnegie-Illinois Steel Corp. (constructional steels); James A. Kinnear, Jr., Carnegie-Illinois Steel Corp. (armor plate); A. O. Shaefer, the Midvale Co. (ingots); L. P. McAllister, Lukens Steel Co. (high tensile steel); W. C. Hamilton, American Steel Foundries (cast armor); F. B. Lounsberry, Allegheny-Ludlum Steel Corp. (tool steel), and C. E. Tuttle, Rustless Iron & Steel Corp.

The members of the British Mission include E. W. Senior, director of the Iron and Steel Division of the British Raw Materials Mission; C. R. Wheeler, deputy controller of raw materials; Dr. W. H. Hatfield, of Thomas Firth & John Brown; Dr. T. Swinden, director of research of the United Steel Co., Ltd.; H. H. Burton, chief metallurgist of the English Steel Corp.; William Barr, of Colville's, Ltd.; D. A. Oliver, of William Jessop's, Ltd.; D. L. Burn, deputy director of statistics of the Iron and Steel Control, and F. H. Saniter of the British Raw Materials Mission.

The Canadian representatives are J. C. Morrow, Steel Co. of Canada; R. H. Davis, Atlas Steel, Ltd., and Howard Biers, Electro Metallurgical Co. of Canada.



STREAMLINED RIVER TUG: Setting a new style in Mississippi River tow design, the "Sohioan," first streamliner on the inland waterways, went into service Feb. 11 for Standard Oil Co. of Ohio. Her three 800-hp. diesels make her the highest diesel powered boat on the rivers. The boat was built by St. Louis Shipbuilding and Steel Co., at St. Louis.

Iron Ore Consumption Again Sets a Record

Cleveland

• • • **Lake Superior iron ore** consumption for the second consecutive month set a new record, with January, 1943, blast furnace and open hearth consumption hitting the new high of 7,765,174 gross tons, as compared with 7,759,366 tons, the previous high, consumed in December, 1942. Consumption in United States alone in January was considerably higher than any previous month, totaling 7,588,699 gross tons, as against 7,540,841 tons in December. Canadian consumption for January was 176,475 tons and for December was 218,525 gross tons.

Ore stocks at furnaces on Feb. 1, 1943, amounted to 33,815,476 gross tons, 32,665,476 tons at American furnaces and 1,150,000 tons at Canadian furnaces. On Lake Erie docks (in United States) there were 5,927,290 gross tons on hand, making the total stocks on Feb. 1 about 39,742,766 gross tons. This compares with 47,424,421 tons stocked a month ago and 33,919,063 tons stocked on Feb. 1 last year.

There was no change in the number of blast furnaces in operation during the initial month of 1943, with a total of 184 of the 191 furnaces in blast on Feb. 1. Of this number, 175 are American furnaces and nine are Canadian, and all seven furnaces not in blast are furnaces in the United States.

Massive Components Made Far from Yards

New York

• • • Practically every type of component except the hull for liberty ships and tankers now building or recently built is made outside shipyards. Construction steel fabricators, chain fence builders, and fireproof door makers, are among the many new entrants into the industry of shipbuilding at a distance. Some are 800 to 1000 miles from the shipyard.

Before the war, everything but the ship's machinery was built at the yard. When the cargo ship building program went into operation, this still held true in large part, but gradually more and more of the work has been let to outside companies. It is the Maritime Commission's policy to promote sub-assembly.

Some of the cargo ship parts which reach the shipyard in finished form are booms, masts and kingposts, cowls, hatches of all types, crow's nests, hawser pipes, hatch shifting beams, storage tanks of all types, steel doors, and stem and stern frames. Many of these pieces are massive; for example the stern frame, made of two castings, measures 27 by 20 ft.

The emergency tankers were designed with the idea of outside fabrication of all parts except the hull. One of the new departures here is that the entire ventilation system is built and almost entirely assembled outside of the yards.

So far, it has been difficult to make hull sections or inner bottoms outside. There has been considerable experiment on sub-assembly of inner bottoms, with the main difficulty that of lining up the curves correctly. Another obstacle to hull sub-assembly is the size of the sections which would have to be transported.

War Building Doubled; Essential Plants Heaviest

• • • **War construction** activity in 1942, which reached a total value of $12,145,059,000, more than doubled the 1941 volume and amounted to more than 97 per cent of the program for the year, the WPB said Feb. 18.

Direct military construction during 1942 was three times the volume of the previous year, and factory construction was 2½ times the 1941 total. Housing construction in the war production areas maintained the 1941 level. Construction of privately financed factories declined.

The monthly volume of construction, which reached a peak of $1,406,015,000 in August, declined for the fourth successive month to $973,285,000 in December.

Plant construction work done for DPC in December was 3 per cent less than in the previous month, while machinery and equipment deliveries in this category increased 8 per cent. Construction work at Army ordnance plants continued to drop sharply with machinery and equipment deliveries still increasing.

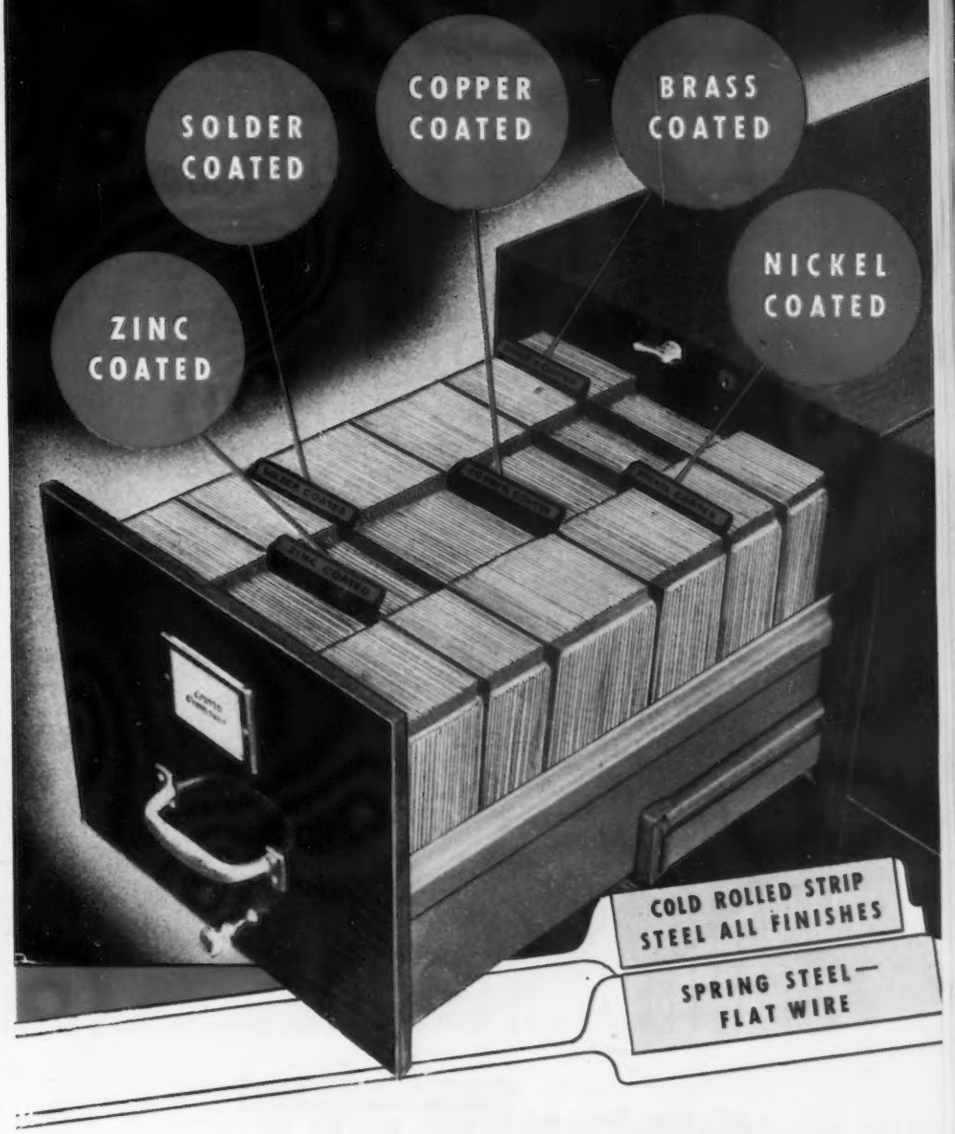
By type of facility, construction decreases occurred in all categories except aircraft. Machinery and equipment deliveries increased at aircraft plants, and at plants manufacturing machinery and machine tools and other industrial facilities. Notable increases by individual type occurred at synthetic rubber plants, where the construction volume in December was three times as great as in November, and at tank plants and machine tool plants, where machinery and equipment deliveries doubled.

Brosky Heads Division Alloting Mine Materials

• • • **Appointment of** Alphonse F. Brosky as chief of the new program section of the Mining Equipment Division was announced Feb. 16 by Arthur S. Knoizen, division director. Mr. Brosky comes from the post of chief, solid fuels unit, WPB Office of Civilian Supply.

The new Program Section has the responsibility for determining materials needed by the mining industry of the United States and other countries, and arranging allotment of such materials under the Controlled Materials Plan. The section will also program production of equipment and supplies for the mining industry to arrange delivery as material is needed.

The Thomas File of Accumulated Data May Contain Your Answer



● The Thomas file of accumulated data extends back for years. These records show how Thomas cold rolled strip steel speeds production and reduces cost for manufacturers. Many examples are available where Thomas strip in uncoated and electro-coated finishes replaces solid non-ferrous metals. Hence, when you present your problem to Thomas engineers, this accumulated knowledge and experience will prove valuable to you.

Thomas Strip
COLD ROLLED STEEL STRIP

SPECIALIZED PRODUCERS OF COLD ROLLED STRIP STEEL

THE THOMAS STEEL CO.
WARREN, OHIO

SWINDELL

HIGH TEMPERATURE
CAR-TYPE FURNACES

LET US CONSULT
ON YOUR PRESENT
FURNACE PROBLEMS

SWINDELL-DRESSLER *Corporation*
DESIGNERS AND BUILDERS OF MODERN INDUSTRIAL FURNACES
PITTSBURGH, PA.

600 Small Plants In Chicago District Under WPB Survey

Chicago

• • • **Engineers of** the War Production Board are completing surveys of 600 small manufacturing plants in the Chicago area, including 60 listed as requiring war work badly, as part of an effort to spread war contracts, it has been reported by WPB.

Several hundred survey reports have already been sent to Washington as a result of a short questionnaire sent out earlier to 5000 plants in Illinois, Indiana, Iowa and Wisconsin by the local Smaller War Plants office.

All small plants which have contracts or subcontracts must file up-to-date information with WPB if it is to remain eligible for addition work. Plants seeking contracts must file such data to become eligible for assistance from the Smaller War Plants division.

The information to be filed includes: Kind of business, products normally turned out, kind of war work the plant is equipped to handle, number of employees a year ago and at present, dollar value of sales in 1941 and by months for the past six months, dollar value of all kinds of business on hand, general description of equipment and to what extent depleted labor force can be replenished.

Contracts for Coastal Cargo Vessels Awarded

Washington

• • • **Contracts for** construction of 19 coastal cargo vessels have been awarded to three firms located on the Gulf Coast, the Maritime Commission announced last Thursday. The firms given the contracts are: Pennsylvania Shipyards, Inc., Beaumont, Tex., nine vessels; Avondale Marine Ways, New Orleans, six vessels, and Pendleton Shipyard Co., New Orleans, four vessels.

Gas Hinders Operations

Buffalo

• • • **For the second** time this winter, subzero temperatures last week pushed natural gas pressure down to a point where some war plants had to suspend metal treating operators for several hours. Both government agencies and the Iroquois Gas Co. appealed to householders to refrain from using gas so that industry might continue operations.

38 Loans Totaling $2.5 Million Made by Small War Plants Corp.

Washington

• • • **The taking of** its first prime contract for $10,000,000 and the negotiation of 38 loans totaling $2,568,770 were the highlights of the bimonthly report to Congress made last Thursday by the Smaller War Plants Corp. In addition, the SWP Division recommended to the procurement agencies 1191 firms who received business in the amount of $195,000,000 during the last 60 days.

Since early December the number of small business concerns obtaining contracts through the division's direct efforts has increased more than fourfold and the dollar volume has increased more than sixfold over the figures submitted in the last previous report to Congress.

Of the contracts arranged by the division to date, 84 per cent are with the various supply services of the Army. More than half the dollar volume of the Army contracts are with the Ordnance Department. Both the Quartermaster Corps and the Air Corps are, however, the source of considerable additional volume. The Navy bureaus, all of which are represented, account for 11 per cent and other procurement agencies, principally Treasury procurement, for 5 per cent of the total dollar volume.

As a result of the division's activities all of the wooden cargo truck bodies scheduled for 1943 are being produced in plants operated by small business concerns. During 1942 most of these bodies were produced by chassis builders. Late in the year educational orders were obtained by the division for 37 concerns. The 1943 orders were placed with 28 of the 37 participating in the educational orders. The importance of this shift goes beyond the fact that small concerns have been given business which they can handle. It has also operated to change the locality of the work from over-crowded production centers to areas distresed through lack of employment.

The division also was instrumental in the placing of contracts for 262 barges with nine concerns located along the Mississippi River, the Gulf and the Atlantic Coasts. An additional 25 barges have been reserved for a production group made up of small boat-building yards located in Florida. The report stated that the total number of loans made since the Smaller War Plants Corp. was set up by Act of Congress had reached 50 for an aggregate amount of $3,174,270.

The Corporation's report pointed out that the New York region led all 12 WPB regional offices in number of applications for loans, of which there were 46, amounting to $6,618,950.36. The other regions ranked as follows in amount requested: Atlanta, $2,215,232; Boston, $2,038,250; Denver, $1,440,624; Cleveland, $1,409,980; Detroit, $1,199,475; Philadelphia, $1,127,595; Chicago, $1,117,257; Dallas, $1,011,500; Minneapolis, $969,000; San Francisco, $626,915; Kansas City, $538,027.

Small Firms Granted Loans In Past 60 Days

Name	Address	Amount
Acro Electric Co.	Cleveland	$ 85,000
Annville Stone Co.	Lebanon, Pa.	100,000
Beechwood Precision Tools, Inc.	New Rochelle, N. Y.	12,000
Breeders Supply Co.	Watkins Glen, N. Y.	11,000
Carworth Farms, Inc.	New City, N. Y.	28,000
Champion Gauge Co.	Corona, L. I., N. Y.	20,000
Delloy Metals Corporation	Philadelphia	10,000
Dixie Shirt Co.	Spartanburg, S. C.	100,000
Eastern Handle	Richmond, Va.	10,000
Eugene Greene, Inc.	New York City	14,000
Everlasting Knitting Mills	Philadelphia	10,000
C & M Screw Products Co.	Long Island City	20,000
Griffin, Palmer A., d.b.a. Griffin's Mill	Kingman, Maine	16,500
Haslett Chute & Conveyer Co	Oaks, Pa.	30,000
R. J. Heyne Machine Shop Co.	Phoenix, Ariz.	10,900
Hunt Bros. & Rasih, Inc.	Philadelphia	34,000
Inland Manufacturing Co., Inc.	Kansas City, Mo.	44,000
Leitch Manufacturing Co.	Middlesex, N. J.	50,000
Medical Fabrics, Inc.	Newark, N. J.	15,000
Merrimac Mills Co.	Methuen, Mass.	450,000
Meyer Corrugated Box Co.	Cleveland	5,000
New Goodwin Preserving Co.	Louisville, Ky.	125,000
Northern Indiana Producers, Inc.	Valparaiso, Ind.	50,900
Norwood Engineering Co.	Florence, Mass.	50,000
Pennsylvania Aircraft Instrument School, Inc.	Philadelphia	5,900
The Penn Tile Works Co.	Aspers, Adams Co., Pa.	5,000
Renown Stove Co.	Owosso, Mich.	100,000
Ramsey Package Corporation	Suffolk, Va.	125,000
Riverside Boat Yard, Inc.	Miami, Fla.	7,500
Standard Sand & Gravel Corp.	Fairfax, Va.	4,000
Strickland Aircraft Corp.	Topeka, Kan.	98,770
Strippit Corporation	North Tonawanda, N. Y.	50,000
Talbot Refining Co.	San Francisco	3,500
U. S. Plating Company	Cincinnati	7,500
Van Buren-Madawaska Corp.	Portland, Maine	700,000
Victor Lumber Co.	Allentown, Pa.	12,500
Wellward Tool, Inc.	Detroit	10,000
Harold G. and J. H. Wyse, d.b.a. Wyse Laboratories	Dayton, Ohio	141,000

Army Places 43,000 Contracts in Small Plants

• • • **About 43,000 contracts** were placed by the seven Army supply services during November and December with plants having 500 employees or less. This figure compares with 53,000 such contracts in effect in plants of this size on Sept. 1, 1942. These figures are announced by the National Industrial Conference Board from information supplied by the War Department.

At the beginning of September, according to the Board, plants of this size had received 20.8 per cent of the dollar volume of outstanding War Department contracts. In November such plants received 23.7 per cent of all new Army orders and in December the figure rose to 24.1 per cent.

Cold Weather Threatens Quick Start by Lake Ships

Buffalo

• • • **Record-breaking** cold weather virtually has dispelled the hopes of Great Lakes vessel operators for an early opening of navigation and a quick start on the 101,000,000 tons of the ore the government wants them to haul this season. Ice now is 15-in. thick in Lake Erie at Buffalo and 16-in. in Superior at Duluth.

Capt. T. Howard Saunders of the International Shipmasters Association said "we had hoped to get going around March 25, the date on which we started last year. The way things look now we will be lucky if we move by April 1. We had a flying start last year and moved 8,000,000 tons of ore by May 1. If we attain that mark this year it will be a miracle."

One More Nelson Directive Needed to Kill Ill-Fated War Materials, Inc.

Pittsburgh

• • • **After creating** War Materials, Inc., last August and then in five subsequent directives thoroughly cutting the underpinning from the organization, Donald Nelson this week had to issue only one more order which would kill this brain child that started out with such fanfare to collect scrap for the war effort.

He was dared to do this by B. C. Moise, president of WMI, who this week told his board of directors, "Either the WPB should take the responsibility of dissolving WMI, or let it do the vital job for which it was created." Furthermore, the tough, one-time vice-president of National Tube Co., insisted "It is our view that the government must receive a fair return for money spent and WMI will not countenance any further expenditures unless it can meet the war needs for scrap in reasonable volume."

The final fireworks in the career of WMI were touched off by the last two directives of Mr. Nelson. In January Nelson halted the initiation of all WPB scrap recovery projects in 30 states, and indicated that WMI might be asked to move only an unimportant amount of scrap during the first six months of 1943. Nelson had previously fixed $40 a gross ton as a maximum amount WMI could pay for recovered scrap, which neutralized approximately 85 per cent of WMI's projects and contracts, since this amount involved recovering rails, the cost of which was somewhat more than $40.

This month, the last act in the "silly symphony" was begun when WPB ordered the cancellation of contracts already executed, even if payments would have to be made to contractors to induce such cancellation. "This," said President Moise, "means that WMI is now to pay government money for the purpose of *not getting* scrap, instead of for the purpose of obtaining it."

The WMI, which originally was slated to dig up 5,000,000 tons of scrap has had a piddling amount of projects fed to it by the WPB Conservation Branch, most of which were high-cost street car rail recovery projects.

Before orders were issued by WPB to let down on contracts already executed, WMI had completed negotiations for 44,812 tons of street car rails at an average cost of $59.30 per gross ton, and 9545 tons of other types of scrap at an average cost of $33.28 a gross ton. However, to date only 8522 tons of scrap have been actually recovered by WMI. This would seem to mean that approximately 44,000 tons of scrap on which contracts were closed may be nullified by recent directives.

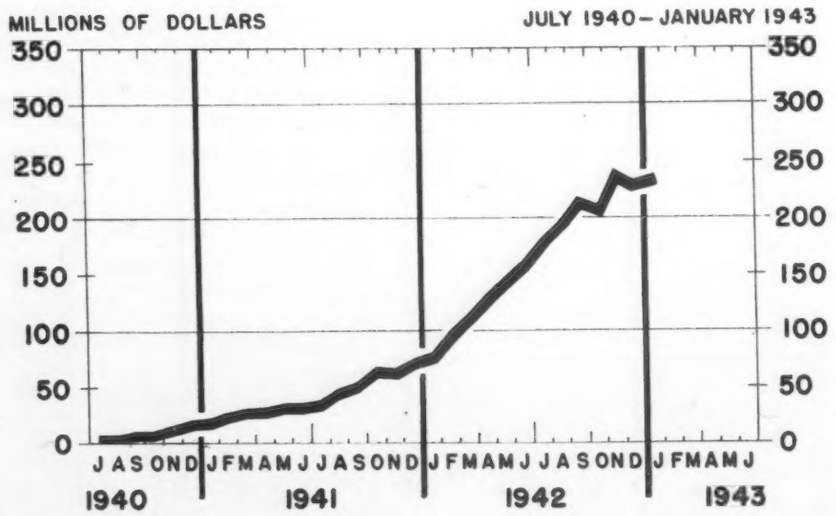
At a press conference, Moise stated that five to 10 times as much scrap could have been obtained if the WPB had presented a steady flow of projects to WMI instead of handing them high-cost rail recovery jobs. Late last fall, the WMI was stripped of its authority to go after scrap and became the mere banker agent and contract closer for the WPB.

For the first time since the organization was formed, the real low-down on the various Nelson directives was made public by Moise. Last October Nelson clipped WMI's wings by loading the entire power to initiate scrap projects in the salvage division of the WPB. WMI was then reorganized and in November the WPB set a limit of $71 a gross ton as a ceiling for scrap recovery. This knocked out a considerable number of contracts on the point of execution, because lowest bids were above the $71 mark. In December the WPB fixed a ceiling of $40 a ton, which in itself effectively stymied any further effort by WMI, at least on rail recovery projects, which constituted the bulk of projects furnished it by WPB.

Moise has taken the position that the war effort will require a considerable tonnage of scrap this year and that the efforts of WMI should fit in to this picture. He claimed, however, that a skeleton organization would be more than useless because of the time necessary to execute and recover the type of scrap involved in projects furnished WMI.

It looked to observers here that since Mr. Nelson had to take only one more step to completely kill off WMI, and since Mr. Moise has defied the last two directives by stating that he would not squander the taxpayers' money, and in view of the fiery and short career as president of WMI of John M. Hopwood, Pittsburgh industrialist who quit WMI last fall, War Materials, Inc., will probably soon be quietly executed itself.

U. S. War Expenditures—Daily Rate



Blast Furnace at Duluth Starts Producing This Week

Duluth, Minn.

• • • **Duluth's** iron and steel making facilities will be increased by over a quarter million tons of pig iron annually when the blast furnace is blown in this week at the Morgan Park plant of American Steel & Wire Co.

The new unit, capable of producing daily approximately 800 tons of iron, replaces an old one dismantled and scrapped several years ago. Moved to Duluth from Joliet, Ill., it has been modernized.

OPA Inclined to Hold Tungsten Ore Prices

Washington

• • • **Information that** some non-marginal producers of tungsten ores and concentrates were considering an increase in prices over recent levels led OPA to state its conclusion that no advance in prices of this strategic ore is justified. Stating prices that it believes reflect the current market fairly, OPA said that, if necessary, it will issue a maximum price regulation to assure the flow of the commodity into needed war production.

The statement was issued following discussions with Metals Reserve Co. and the WPB. Conferences were also held over the past several weeks with individual producers, consumers and dealers.

"Some confusion has arisen," OPA said, "over recent announcement of the revised buying schedule of the Metals Reserve Co., which advanced prices from $24 to $30 per unit to 'eligible' and 'new' domestic tungsten ore producers." (A unit is 20 lb. of tungsten trioxide (WO_3) contained in ore). "Production of such 'eligible' and 'new' domestic producers was in fact marginal and submarginal. No bulk-line advance in prices to be paid to producers generally was contemplated.

"A study of ore prices which have been paid during 1941 and 1942 indicates that such prices are about 50 per cent higher than prices prevailing in 1939 prior to the outbreak of the war. No further advance in tungsten ore prices is believed justified in view of the ceiling price of ferrotungsten, in the production of which 70 per cent of the tungsten ore is consumed; nor is such an increase deemed necessary."

"The OPA calls attention to its approval of the following prices for tungsten ores and concentrates as sold by the Metals Reserve Co. to consumers:"

"Wolframite and Ferberite—$24 per unit for ores of Metals Reserve Co.'s standard specification.

"Scheelite and Huebnerite—$25 per unit for ores containing 60 per cent tungsten trioxide and meeting the Metals Reserve Co. standard maxima for impurities; with a premium of 20c. per 1 per cent tungsten trioxide above 60 per cent up to and including 70 per cent, and 10c. per 1 per cent tungsten trioxide above 70 per cent, up to and including 75 per cent; and with a penalty of 20c. per 1 per cent tungsten trioxide, down to and including 55 per cent.

"A premium of $1 per unit is charged for domestic ores treated at the request of the buyer to specifications as to impurities of lower than standard maxima. Differentials of 50c. per unit prevail for shipments of less than carload down to 5 tons and $1 per unit for shipments of less than 5 tons. Synthetic scheelite in an unnodulized form is priced at $24 per unit.

"The foregoing prices are f.o.b. New York, plus a 10c. per unit handling fee."

There is a serious shortage of scrap metal, and unless every pound of scrap that's lying around idle is salvaged, the mills may be forced to slow down or discontinue operations.

For every ton of steel produced there must be approximately one thousand pounds of scrap metal. And to keep steel production up, the mills must have millions of *extra* tons of iron and steel scrap.

Everyone is urged to cooperate. Salvage every pound of scrap metal you can find. Then call in the junk dealer who will pay you for it and get it started in the right direction.

Don't delay, the need is urgent. Collect your scrap NOW!

THE ANDREWS STEEL CO.
NEWPORT, KENTUCKY
DIVISIONS
THE NEWPORT ROLLING MILL COMPANY
THE GLOBE IRON ROOFING & CORRUGATING CO.

CMP Basic Plan Stands With Wilson;

New York

• • • **The injection** of a new personality as an overall control of both the production scheduling and material flow features of the WPB in the person of Charles E. Wilson, executive vice-chairman, is certain to bring modest modification and changes, not all necessarily based on inherent difficulties. Just as CMP was built around the personality of Ferdinand Eberstadt so the apparent differences of opinion between the two men is seen as being bound to reflect in policy and operating changes.

Opposing this line of thinking is the recent statement by Wilson that CMP is basically sound and that alterations would be held to a minimum. So far as the statement goes this is probably true in that not only Mr. Wilson but the industries involved believe CMP to be basically sound and workable with alterations to suit the difficulties as they appear.

Numerous changes and improvements are actually going on right now although these cannot all be attributed to the influence of Mr. Wilson. One of the most recent has been the revision and simplification of Regulation No. 1 which is claimed to have been so sweeping in character that the need for form CMP-6 which advised of acceptance or rejection of an order and related order information was eliminated.

CMP producers, while well satisfied to see paper work eliminated in the removal of an extra form, believe, at least in part, that some report of the same nature will still be necessary. This, perhaps, is only because the matter has not had time to jell properly. The official pronouncement of the elimination of the form, however, states that a new and simpler method of obtaining the same information is in the development stages. The report also announces the fact that elimination of the form would remove the necessity for the handling of 12-million pieces of paper by industry in the first six months of CMP. Whether this will be a fact or not remains to be seen from the nature of the new method developed.

Announcement of a new inventory and consumption report for aircraft users of aluminum to be filed on a quarterly basis by all aircraft consumers was made late last week. The form, PD-40A Aircraft, was made to conform with the general inventory report form for the metal, CMP-7, so that information is readily transcribed. Since this branch of CMP activity has been under Wilson's jurisdiction, this change is believed to be one of his.

Also occurring late last week was the reorganization of the WPB Copper Division into four staff sections and nine operating branches. This change was admittedly aimed at preparation for the inauguration of CMP on April 1.

Smoothing the transition from PRP to CMP the Director General for Operations last week revised Priorities No. 3 to make it conform with CMP Regulation No. 5 covering MRO supplies. The change is designed to facilitate the period when both priorities and order numbers will be handled by producers.

CMP Regulation No. 6 is said to be ready for signing at this writing. It will relate to the construction of facilities. According to available information, applications for permission to proceed with any new project will be made in accordance with established WPB procedure to either a Claimant Agency or Industry Division as in the past. Applications fall into several classifications each requiring slightly different handling.

Projects involving the use of Class B products or non-controlled materials will be applied for on forms PD-1A, PD-3A, etc. according to existing regulations.

Projects not involving construction but requiring the purchase of Class A and Class B products or controlled materials as such will require application on CMP-4A forwarded direct to the appropriate Claimant Agency or Industry Division.

Projects which do not involve construction but require the use of controlled materials as such whether requiring Class A or B products or not should be applied for on existing WPB forms the best known of which is PD-200.

o o o

CONFIDENTIAL—For Use of Federal War Agencies Only

Bureau of the Budget No. 13-R 507-42
Approval Expires May 30, 1943

DO NOT USE
Prod.
No.

FORM CMP-7 (2-16-43)

UNITED STATES OF AMERICA
WAR PRODUCTION BOARD

QUARTERLY REPORT ON SHIPMENTS OF PRODUCTS AND INVENTORIES OF CRITICAL MATERIALS

FILE ORIGINAL AND TWO (2) COPIES WITH THE WAR PRODUCTION BOARD, WASHINGTON, D. C., REF. CMP-7, NOT LATER THAN FEBRUARY 28, 1943. READ INSTRUCTIONS CAREFULLY BEFORE FILLING OUT FORM.

PRP Serial No. (if under PRP in first quarter 1943):

Name and address of company:

If entire plant is not covered by this report, state department or operating unit covered:

Plant to which this report applies:

Location (street, city, State):

Item (1).—Did the operating unit or units covered by this report use during the calendar quarter October-December 1942 or hold in inventory on December 31, 1942, any one of the following materials (in the shapes and forms listed in Section B) in excess of the quantities specified: carbon steel, 75 tons; alloy steel, 15 tons; aluminum, 2 tons; all other CMP materials listed in Section B combined, 10 tons?

☐ YES ☐ NO

If the answer is "Yes," fill in both Section A and Section B completely.

Item (2).—Did the operating unit or units covered by this report hold on December 31, 1942, nonusable inventory of any one of the following materials (in the shapes and forms listed in Section B) in excess of the quantities specified: carbon steel, 5 tons; alloy steel, 1 ton; any other item listed, 500 pounds?

☐ YES ☐ NO

If the answer is "Yes," fill in Section A and Column (5) of Section B.

Section A.—SHIPMENTS OF PRODUCTS DURING CALENDAR QUARTER OCTOBER-DECEMBER 1942

DO NOT USE	Description of Classes of Products	CMP Materials Used in Products (Indicate by "X") 1 Aluminum	2 Carbon Steel	3 Alloy Steel	Other CMP Materials	Unit of Measure	Total Quantity	Total Value (thousands of dollars)	Give Figures in Thousands of Dollars: U. S. Army (excluding aircraft)	U. S. Navy (excluding aircraft)	Aircraft	U. S. Maritime Commission	Board of Economic Warfare	Lend-Lease	Other and Unidentified
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
	TOTAL														

(Continued on next page)

Regulation No. 6 Due This Week

CMP

CMP-6 Unnecessary; WPB Explains Plan

Washington

• • • **WPB abolished** Form CMP-6 last Friday in a move to eliminate the filing of approximately 500,000 of them monthly. The killing of the form was recommended by the Bureau of the Budget as it was thought the results would not be commensurate with the labor involved in preparing them.

CMP-6 was intended to serve two purposes: (1) to provide a check on inflation of allotments, and (2) to provide a statement of actual deliveries to special programs. Through the form the Controlled Materials Divisions would have been able to know the loads being placed on individual mills daily so that they might divert orders from those producers already operating at capacity to others with available facilities. The form was also to serve as a guide to CMP Divisions in issuing production directives. However, it is now thought that a monthly report on Form CMP-8 which is obtained from the mills and shows unfilled orders and shipments would be satisfactory. CMP-6 was to be filed by consumers.

However, some WPB officials point out that production directives may not be necessary after July 1. It is claimed that they have been needed in the past to prevent mills from making the more remunerative lines and neglecting to make necessary steel products. WPB now says that when CMP is fully operative, bringing programs into balance, the production directives will be superfluous. Mills will have to meet consumer requirements.

In cases where there are fabricating bottlenecks, production directives can be safely eliminated when the CMP Divisions schedule at the mill level. This would make production directives unnecessary and likewise end the purpose of CMP-6.

The Copper and Steel Divisions have hired nearly 100 employees and installed extensive IBM tabulating machines. However, these machines were not purchased but rented. The Steel Division alone planned to employ 250 workers. This will now be unnecessary.

CMP-6 Banned by WPB to Reduce Paper Work

New York

• • • Evidently still stinging from criticism concerning the amount of paper work connected with the operation of CMP the WPB announced a new reduction in required report forms last week with the elimination of form CMP-6. Although this form had never actually been issued it was illustrated in the CMP explanation bulletin of Nov. 2 and was designed to accompany all orders to producers in triplicate.

A close reading of CMP Regulation No. 5 had brought up a serious question as to whether the CMP-6 form was to be used with MRO orders or not. Up until the issuance of the new order banning the form no definite opinion could be gotten on the subject and a revision or interpretation of the regulation seemed imminent. The subject of the use of CMP-6 had been covered rather thoroughly in Regulation No. 1 but only vaguely in Regulation No. 5.

o o o

Percentage Allotments Won't Apply to Secondary Firms

• • • **Advance authorization** of CMP materials to manufacturers of Class B products, issued last week by Curtis E. Calder, stressed that the percentage allotment permitted in the first month of the quarter would not be in effect so far as secondary consumers who relied on prime consumers for reallotments were concerned.

Manufacturers of Class B products who have submitted their CMP-4B applications may place orders for April delivery with the benefit of allotment numbers immediately upon receipt of their letters of authorization. However, as soon as manufacturers receive allotments for the full quarter beginning April 1, they must make adjustments necessary to keep their total receipts of controlled and other materials during the second quarter within the limits of the final allotment.

The letter sent to producers of Class B products points out that prime consumers should advise those manufacturers to whom they make reallotments of a portion of the 30 per cent advance allotment that the provisions in paragraph S-1 of CMP Regulation No. 1 as amended, limiting the use of allotments to specified percentages during each month of a quarter do not apply in this instance. As a result, manufacutrers may place orders for all or any part of the 30 per cent advance allotment which they may require for delivery in April, subject to other regulations and rules of the War Production Board.

Priorities Regulation 11A, announced some time ago, provided a procedure for transition from the production requirements plan to CMP, which permitted companies operating under PRP to continue use of a percentage of their first quarter PRP authorization during the second quarter if they were not yet under CMP. However, that procedure only authorizes the use of preference ratings which will be subordinate to allotment numbers in obtaining controlled materials during the second quarter.

As sure as you read this, you will use Stainless Steel wire again *for domestic production*

When that day comes, it is more than likely that there will be many reasons for broader use of Stainless. There may be a more favorable first cost. Working qualities may be known better. War use certainly has put Stainless and Stainless Wire on new ground.

No one is more awake than **PAGE** to this new place of Stainless Steel and Stainless Steel Wire. Currently, war production takes all of a considerably increased output—and gives us rich experience that will be placed at your service when peace comes.

That experience—a plus to the fact that wire has always been the business of **PAGE**—is at your service right now, as you plan.

PAGE *Stainless Steel* **WIRE**

PAGE STEEL AND WIRE DIVISION

Monessen, Pa., Atlanta, Chicago, New York, Pittsburgh, San Francisco

In Business for Your Safety

AMERICAN CHAIN & CABLE COMPANY, Inc.

BRIDGEPORT • CONNECTICUT

CMP Accounting Is Simplified by New Allotment Manual

Washington

• • • **Harold Boeschenstein,** CMP Division Director, announced last week that a Consumers Allotment Accounting Manual, to assist manufacturers in organizing the record keeping and accounting required under CMP, will be available by the end of this month.

The manual is for manufacturers' accounting for allotments of controlled materials and the re-allotment or placement of orders for the delivery of materials. Although the manual has been prepared by the WPB Controller Division, there is no requirement that the records and accounts be kept in the manner set forth. Rather, the manual is intended to suggest simple methods that may be used.

The manual deals with accounting for allotments and does not cover the keeping of records of actual receipt, shipment or use of any material. The records which a manufacturer normally maintains on material received, put into production and in inventory, should be sufficient to show that the materials were used for the authorized production schedule. Such records must not be confused with the suggested records for allotments under CMP.

Among the more important suggestions of the Consumers Allotment Accounting Manual is the possible use of a file case record as compared with a card or ledger record, if all transactions regarding an allotment are handled at one time. If the manufacturer's method of operation does not permit the use of a more simple file case record, a record designed for a 5 in. by 8 in. card is proposed in the manual.

A separate card should be used for each controlled material item identified on the allotment form received for each major program of a Claimant Agency and for each calendar quarter. Entries in the "Allotments Received" column are made from forms CMP-4A, CMP-4B, CMP-4C and CMP-5 received by the consumer. Re-allotments to other consumers are made on CMP-4 and CMP-5 forms, or by endorsement on purchase or delivery orders and the quantities contained are posted in the column headed "Re-Allotted to Other Consumers," reducing the "Allotment Balance." When orders are placed

with primary producers or warehouses calling for delivery of controlled materials, the quantities ordered are posted in the "Orders Placed" column and the "Allotment Balance" reduced.

Allotments received by prime consumers direct from Claimant Agencies will be accompanied by a complete allotment number consisting of a letter symbol, four digits representing the program number and three additional digits indicating the authorized schedule number. Consumers are required to pass on only the Claimant Agency letter symbol and the first digit of the four digit number, which is used to identify a major program of a Claimant Agency.

Manufacturers' records need not segregate all transactions pertaining to each complete allotment number. Instead, consumers may combine all allotments received into major programs of Claimant Agencies.

In addition, consumers account for allotments of controlled materials—steel, copper and aluminum—by quarters, instead of months. Allotments for the second quarter of 1943 will be identified by "—16," following the agency symbol and major program number; allotments covering the third quarter of 1943 by "—19"; fourth quarter allotments by "—22," and allotments for the first quarter of 1944 by "—25."

•

Start of Geneva Plant Now Set for "Late '43"

San Francisco

• • • **Construction of** the $150,000,000 Geneva Steel Works near Provo, Utah, is progressing as well as can be expected in the face of a difficult priority situation, according to officials of Columbia Steel Co. It is now estimated that the Geneva Plant will not be in operation much before the end of 1943, despite previous mid-summer estimates.

Now that parts of the huge steel plant are well into the steel erection stage and other parts are fast approaching that stage, the stringent steel priorities are operating to slow up construction

For many years, Columbia Steel Co. has been operating a blast furnace at its Ironton Plant near Provo, Utah. The national government, through the Defense Plant Corp., is adding another large blast furnace, which is scheduled to go into production of pig iron around the first of March. It will produce about 950 tons of iron daily.

Where "All Outdoors" is Your Warehouse!
MANY plants are now forced by lack of adequate inside space to store materials out of doors—creating handling problems which can be efficiently solved with Ross Heavy-duty Hydraulic Lift-trucks. These pneumatic-tired machines with their balanced chassis design have the stability essential to swift, economical handling of heavy loads on unimproved surfaces—where most types of machines cannot operate. Ross Heavy-duty Hydraulic Lift-trucks, 3 to 7 ton capacities, may be the solution to your out-side storage problems...Write for Bulletin 1-23 today.
ROSS
HEAVY DUTY MATERIALS-HANDLING EQUIPMENT
BENTON HARBOR • MICHIGAN

Details of First Changes Named In Swing to CMP for Aluminum Trade

New York

• • • **The changeover** to CMP operation in aluminum is bringing about some new WPB orders and rulings to live by. All aluminum producers and fabricators have been asked to file PD-26A by the 15th of the second month preceding shipment for the months of April, May and June for all aluminum products except ingot for direct use purposes.

All orders on foundries and powder mills for April, May and June delivery, whether or not covered by CMP-6, indicating authorized CMP allotment numbers, must be listed on PD-26A for authorization to ship. This is done to enable foundries and powder mills to schedule production of orders without waiting for customers to receive CMP-4A and CMP-4B allotment authorizations.

Accordingly, foundries and powder mills should require their customers to support their orders where possible with CMP-6's; in the event that customers have not received allotments on CMP-4A or CMP-4B, and therefore are unable to file CMP-6's, orders may be accepted and listed on PD 26A's.

In filing PD-26A's with the Aluminum and Magnesium Division of the War Production Board, the following procedure will apply with respect to foundries and powder mills: (1) For items covered by CMP-6's, indicate only the customer's name, allotment number (in column 3, and the weight and alloy. Do not indicate preference rating, end use, or contract number. (2) For all items not covered by CMP-6's, fill in complete data in accordance with PD-26A instruction sheet, as in the past. (3) Group all items by Claimant Agencies, listing orders covered by CMP-6's first and then all other orders according to preference ratings.

Shipment may be made only pursuant to PD-26A authorizations. Ingot for foundries and powder mills will be released on the basis of their PD-26A approvals as in the past.

Ingot for direct use purposes (alloying, deoxidizing, reduction of ferroalloys, anhydrous aluminum chloride, etc.) may be shipped only against CMP allotment authorizations as evidenced by properly executed CMP-6's furnished to producers or smelters by customers who have filed and received authorization on Form CMP-13, application for aluminum for these purposes.

Due to the great demand for primary aluminum, the Aluminum and Magnesium Division has been compelled in past months to make cuts ranging up to 30 per cent on the primary alloys approved on PD-26A schedules where such approvals indicated that the aluminum would be purchased from the Aluminum Co. of America. These cuts have been made with the understanding that the unfilled and approved balances could be obtained from secondary smelters.

It has been determined that there are a number of high grade alloys which may be obtained in secondary from smelters and successfully blended with larger amounts of ingot of the same alloy obtained from primary producers. For March, the Aluminum and Magnesium Division has released

★ WHEN THIS WAR is won, many a plant official will have learned that metal products can be cleaned faster and more efficiently in machines *especially designed* and engineered to do the job or series of jobs required.

An example is this A-F complete rotary drum unit *built especially* to speed-wash, speed-rinse, lubricate and dry 30 to 50 calibre cartridges.

If your plant is producing metal products for war, it, too, can enjoy the "post-war miracle" of an A-F Cleaning or Finishing Machine *especially designed* and incorporating every modern feature. Without obligation on your part, write us details of your cleaning or finishing problems, or send for newest folders describing processes that are helping bring victory faster.

THE ALVEY-FERGUSON COMPANY, 714 Disney St., Cincinnati, O.

CONVEYING EQUIPMENT

A-F CONVEYING MACHINERY

Alvey-Ferguson

METAL PRODUCTS CLEANING & FINISHING EQUIPMENT

The Answer to a Foreman's Prayer

This is a valve part . . . used in aircraft instruments. The foreman in charge of its production had a fairly happy lot—until nickel hit the "critical" list.

This particular piece was made of alloy steel, rich in nickel. Came a recent day, however, when the specified steel became as scarce as coffee. It looked like production quotas were due to start skidding.

Putting the problem up to Frasse, the foreman substituted, as per recommendation, a more plentiful low-nickel emergency steel —NE 8620. The only wrinkles—slight changes in machining and tempering—were quickly ironed out, leaving hardly a ripple in the production schedule. Trouble hasn't reared its head since.

Frasse technical representatives have been gathering such operating data on the new emergency steels for months. If you are still in the contemplating stage, or have struck a "bug" in changing over, Frasse engineers will be glad to pitch in. Their advice is gratis. Just write or call: *Peter A. Frasse and Co., Inc., Grand Street at Sixth Avenue, New York, N. Y. (Walker 5-2200) • 3911 Wissahickon Avenue, Philadelphia, Pa. (Radcliff 7100—Park 5541) • 50 Exchange Street, Buffalo, N. Y. (Washington 2000) • Jersey City, New Jersey • Hartford, Connecticut • Rochester, New York • Syracuse, New York.*

SEAMLESS MECHANICAL AND AIRCRAFT TUBING
COLD FINISHED BARS · ALLOY STEELS · DRILL ROD
STAINLESS STEELS AND TUBING · AIRCRAFT STEELS
COLD ROLLED STRIP AND SHEETS · WELDED STEEL TUBING

Frasse
Mechanical and Aircraft STEELS

100 per cent of requirements as approved on PD-26A for primary alloys, calling for delivery from the Aluminum Company, but at the same time request that foundries do not purchase more than 75 per cent or less of primary requirements from the Aluminum Co. The remaining 25 per cent of ingot requirements should be obtained from secondary smelters and blended with the 75 per cent or less obtained from the Aluminum Co.

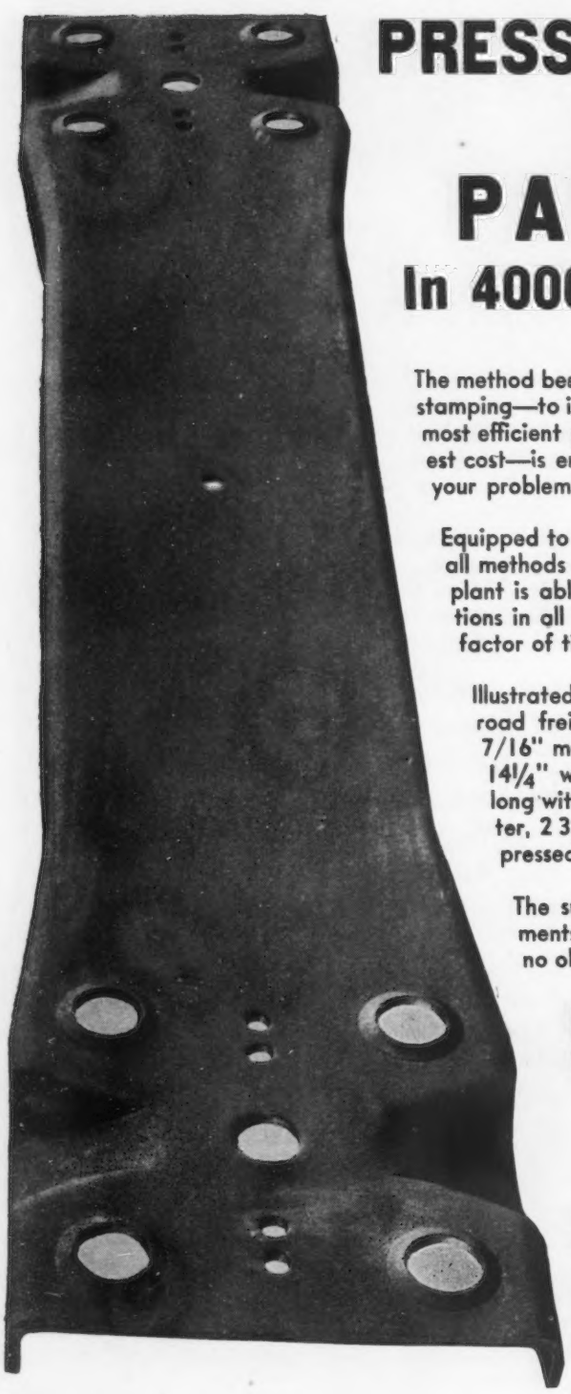
The Aluminum and Magnesium Division has requested that all foundries and die casters report to it the amount of voluntary saving in purchases from the Aluminum Co.

Announcement of a revised aluminum inventory and consumption reporting form for use by aircraft consumers of the metal was made by the WPB Aluminum and Magnesium Division.

This form, PD-40A Aircraft, dated Feb. 4, 1943, supersedes a similar form dated April 15, 1942. The first report, covering the current month, is due by March 15. Thereafter, the report must be filed monthly by the 15th of the month following the month covered.

Only two copies of the new PD-40A Aircraft form are required, one of which is to be sent to the Aircraft Scheduling Unit, Steele High Building, Dayton, Ohio, and the other to the Aluminum and Magnesium Division, Temporary Building R, Washington. The report must be filed by each PRP unit or other consumer for any month in which aluminum products in excess of 1000 lbs. were used in the manufacture of the following: aircraft, aircraft parts or equipment; and in any item incorporated into or carried by aircraft as they fly, exclusive of guns, ammunition, bombs and pyrotechnics. Users of aluminum for such products as airborne radio equipment, or aerial photographic equipment, etc., must file PD-40A.

The reporting classifications on the form have been revised to conform with the categories on the special application form for aluminum issued by the Aircraft Scheduling Unit under CMP. The new PD-40A Aircraft form is not a substitute for the general quarterly inventory report on form CMP-7, but the classications are established so that the data required by CMP-7 can be obtained from the PD-40A Aircraft without additional accounting. The PRP units who file the monthly PD-40A Aircraft form need not file quarterly inventory form.



PRESSED COLD by PARISH In 4000 ton Press

The method best suited for each particular stamping—to insure most effective results, most efficient production and most modest cost—is employed when you present your problems to the Parish plant.

Equipped to handle all types of work in all methods and sizes of stamping, our plant is able to meet your specifications in all its elements, including the factor of time.

Illustrated is a Spring Plank for railroad freight car trucks. Made of 7/16" metal—16⅝" wide at ends, 14¼" wide at center and 93¼" long with flanges 3⅜" high at center, 2 3/16" high at ends—it was pressed cold from heavy steel

The submission of your requirements for review involves you in no obligation.

PARISH
PRESSED STEEL CO.
READING, PENNA.

Pacific Coast Representative
F. Somers Peterson Co.,
57 California St.,
San Francisco, California

We have turned our facilities over entirely to the manufacture of various products required by the United States Government and American Railroads.

MRO Supplies Are Redefined in P.R. No. 3

Washington

• • • **Maintenance, repair** and operating supplies, as previously defined in Priorities Regulation No. 3, redefined by amendment announced Feb. 16.

Changes effected by this action eliminate from the definition of maintenance, repair and operating supplies the following categories of material, even though they have been carried as such according to established accounting procedures:

1. Materials for maintenance or repair of buildings.
2. Fabricated containers (in knockdown or set-up forms, whether assembled or unassembled), required for packaging products to be shipped or delivered.
3. Printed matter, stationery and office supplies.
4. Paper, paperboard and products manufactured therefrom; molded pulp production.
5. Fuel or electric power.
6. Office machinery or office equipment
7. Clothing, shoes or other wearing apparel (with specific exceptions) if made of leather or textiles.
8. Materials for plant expansion or plant construction.

HOW SHEET MILL "DISCOVERED" 11 MUCH-NEEDED MEN

—and what Hele-Shaw Fluid Power Engineers had to do with it

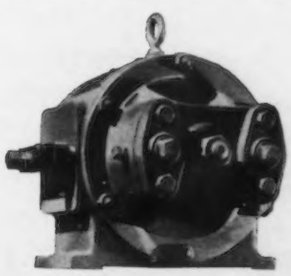
In a sheet mill, whose name we can't quote, men were laboriously reducing billets to sheets. Fourteen men were required to "manipulate" the billet and sheet in its journey, fourteen men needed elsewhere in the mill for essential war work.

This mill had used Fluid Power and had an idea Hele-Shaw Fluid Power Engineers might help them.

Before our engineers left they had: 1. schemed a hydraulic mechanism (powered by a Hele-Shaw pump, and functioning through valves and cylinders) which duplicated nearly all of the hand operations, and 2. whittled the number of men required from 14 to 3. One man now starts the billet through the rolls, one removes the finished sheet, and the third controls all intervening operations by means of a centralized push button control.

Saving labor is not always the reason for trying Fluid Power, and may not be yours. If you want to improve a product or process, or simplify the control or operation of a machine in your post-war planning, Fluid Power and Hele-Shaw engineers may be able to help you. Why not find out?

THE **Hele-Shaw** *Fluid Power Pump*



OTHER A-E-CO PRODUCTS: TAYLOR STOKERS, MARINE DECK AUXILIARIES, LO-HED HOISTS

AMERICAN ENGINEERING COMPANY

2410 ARAMINGO AVENUE • PHILADELPHIA, PA.

Allocation Bars Some Warehouses From Needed Stock

Cleveland

• • • **One of the major** problems faced by the secondary steel products jobber and warehouseman is in some of the inequities of the warehouse allocation system that work a distinct hardship on such jobbers in that they are unable under the system to obtain some items.

Allocations to warehouses are based on the first quarter of 1941, and many of these warehouses, working on a hand-to-mouth basis as to their purchases, did not purchase or have in stock certain lines or items that they normally might carry. They are now unable, under the system, to obtain these items.

For example, Detroit jobbers during the early months of 1941 would quite likely have been doing a substantial business in sheet products, but little in plate, since Detroit was not a plate consuming center. Now, however, with a large percentage of Detroit's armament production consuming plate, such jobbers naturally would prefer stocking this item, but are unable to obtain it under the allocation setup, since they did not have it in the initial quarter of 1941.

While it is quite feasible under the present PRP and the coming CMP to have a buying agency or a contractor pass along ratings sufficiently high to permit the warehouse to get the items from the mill, the normal warehouse advantage of immediate delivery is destroyed.

This factor under the present warehouse allocation system is one that is causing considerable trouble to the secondary jobber and it is expected that a request for alleviation of the difficulty will be presented to the WPB shortly.

•

Second Suspension Ordered for Tyne Co.

Chicago

• • • **Since their indictment** last September by Chicago's Federal Grand Jury on charges of misrepresentations to WPB, John J. Tyne, Jr., Nicholas Hermes and Thomas J. Fogarty, now awaiting trial, and John J. Tyne, Sr., all members of a partnership doing business under the names of Tyne Co. and Illinois Ordnance Works in Chicago, have committed similar offenses against WPB orders and regulations.

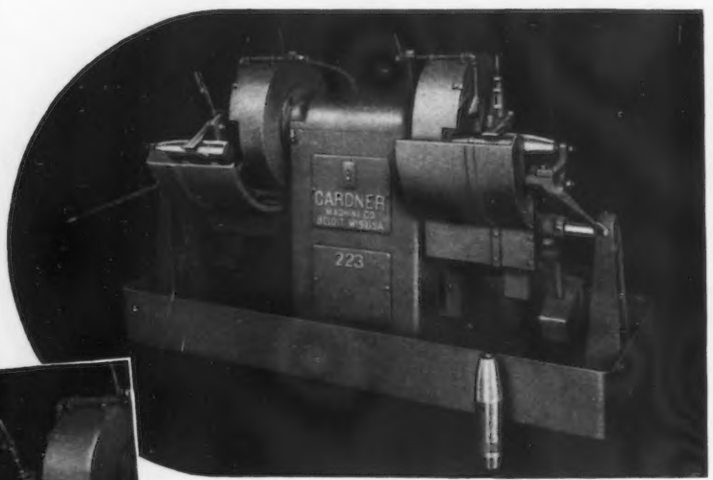
As a result of the more recent violations, the Director General for Operations has announced issuance of Suspension Order S-243, denying all priority assistance to the Tyne Co. and Illinois Ordnance Works, and its four partners, individually, for a period of three months. The violations committed despite the September indictments made this action necessary to conserve scarce material for essential war production, pending disposition of the court cases.

•

Copper Limited In Safety Equipment

• • • **Copper and copper base** alloys no longer can be used in manufacturing certain items of safety equipment according to Limitation Order L-114 as amended Feb. 16 by WPB.

"Safety equipment" is redefined in the amended order to cover a wide



Helping *speed* these "105's" *toward Tokyo!*

DEPENDING upon the manufacturing "set-up", many shells like the 105 millimeter illustrated here, must be ground on the butt end.

A Gardner No. 223-23" Standard Single Spindle Disc Grinder, equipped with 2 special hand-clamping fixtures mounted on lever-feed tables, is representative of a number of Gardner Grinders which have been installed for this work. Two operators are used on this particular unit, of course.

PRODUCTION: 50 to 60 shells per hour, per operator, removing 1/16" maximum stock for a clean-up.

For shells, or for dozens of other flat surface jobs, GARDNER-GRINDING is simple, efficient—and FAST!

WRITE FOR BULLETIN 200B

GARDNER-GRIND YOUR *Flat* SURFACES

GARDNER MACHINE COMPANY

412 East Gardner Street • • • • Beloit, Wisconsin, U.S.A.

How INCO Technical Service helps you conserve critical materials

No matter whether newspaper headlines feature priorities, "PRP", or the Controlled Materials Plan, the need for conservation never lessens. The war must be fought and won. That means critical materials by the carload.

Perhaps you know that every pound of alloy must give maximum service if our far-flung fighting forces are to be supplied and maintained. Nickel, particularly, is needed to give wartime steels greater strength, toughness and resistance to impact.

INCO's technical staff is organized to serve users of metals and alloys—to help manufacturers find and adapt alternative materials without sacrificing desirable and essential characteristics in the finished product.

So if you have a problem involving the use of alloys—Nickel or otherwise—please write or wire for data or counsel from our technical staff.

NICKEL

THE INTERNATIONAL NICKEL COMPANY, INC. 67 WALL STREET NEW YORK, N. Y.

range of devices, articles and signs used to promote safety, and to prevent or minimize accidents, injuries or occupational hazards. The term does not include any automotive or traffic equipment or devices.

•

Fans, Blowers Limited

• • • **Control of production** and delivery of fans and blowers was placed under a new limitation order L-280 Feb. 17, by WPB.

Scheduling delivery of all orders for new fans and blowers by manufacturers after Feb. 28, 1943, is required. The manufacturer must report monthly his delivery schedule for the next two months. The control provision of L-280 does not apply to purchase orders for repair parts within certain value limitations or to meet emergency breakdown situations specified in the order.

Phoenixville Given Price Aid

Phoenixville, Pa.

• • • **In a move,** seen as an equalization for increased labor costs, OPA granted Phoenixville Iron Co. here permission to increase prices on bars and shapes at established basing points. This increase did not affect the export price allowance which was previously set 2.50c. Phoenixville.

The price action is interpreted as an equalization for the NWLB order of last month granting Phoenix Iron

This Week's Priorities And Prices

Domestic metallurgical manganese ore sales to dealers for resale and to users or processors who use the ore directly in producing steel were exempted from price control through Amendment No. 2 to Maximum Price Regulation No. 248, effective Feb. 20. (OPA-T-590)

Copper and copper base alloys may not be used in the manufacture of safety equipment under amendments made to order L-114. (WPB-2563)

Additional premiums for zinc and lead production have been offered in cases where such additional premiums are considered essential to insure maximum necessary mine production. (OWI-1281)

Production of fans and blowers has been limited by order L-280. (WPB-2567)

For copies of above announcements Address Office of War Information, Washington, giving announcement number as shown in parentheses after each paragraph. (For example, WPB-600 *means announcement* 600 *issued by the War Production Board.)*

■ ■ ■

Revisions to The Iron Age Priorities Guide

• • • The following data, together with all intermediate weekly revisions in THE IRON AGE, should be added to THE IRON AGE Priorities Guide published with the issue of October 8 to bring the Guide up to date.

Priority Regulations:

No. 3...Amendment redefines maintenance, repair and operating supplies as previously defined in regulation (2-16-43).

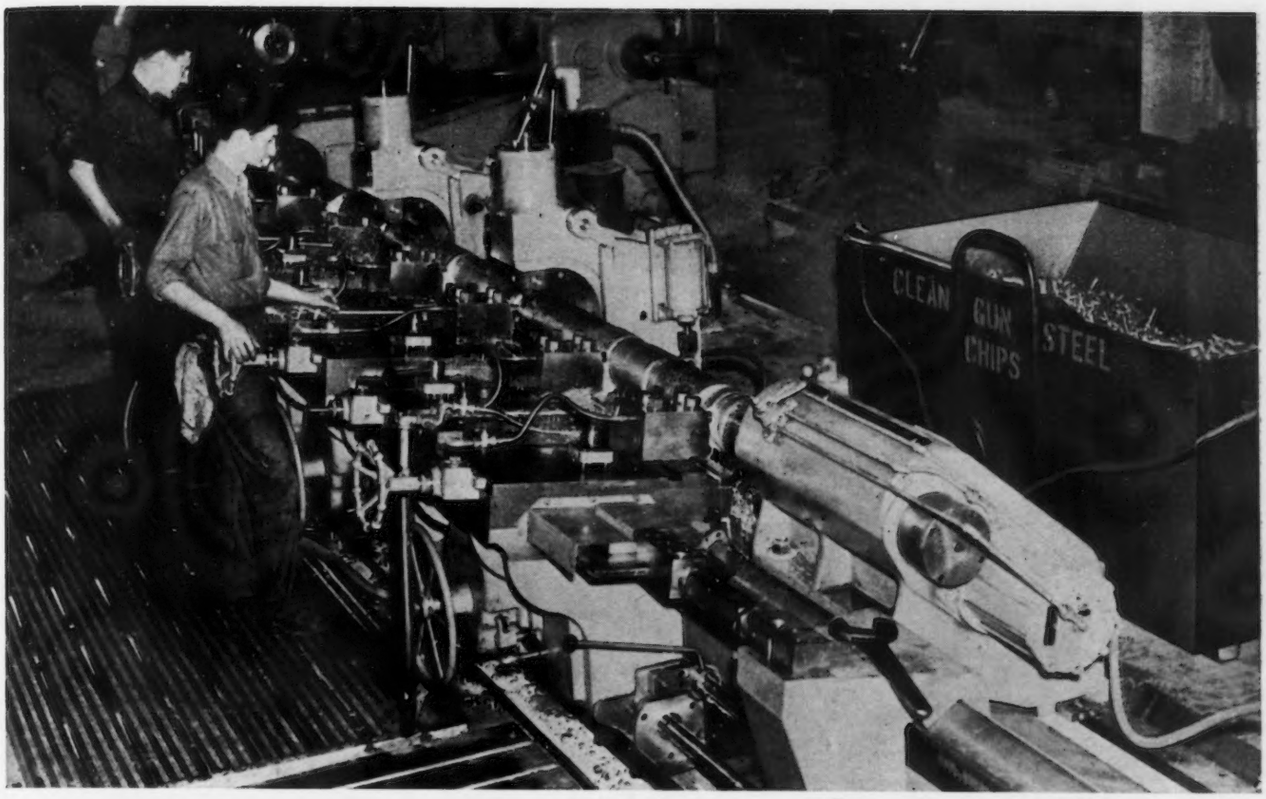
"L" Orders:

L-71-a...Amended order further standardizes batteries for hearing aids (2-17-43).

L-97...Interpretation No. 1 (2-15-43) clarifies certain terms in the order.

L-114...Amended order prohibits use of copper and copper base alloys in manufacture of safety equipment (2-16-43).

L-280...Order places imitation on production of fans and blowers (2-16-43).



The **DEMPSTER-DUMPSTER** Picks up a loaded body . . . Hauls it . . . Dumps it . . . and returns the "empty" for another "pick-up" while other Detachable Bodies are being loaded.

CLEAN GUN STEEL CHIPS—

—precious metal these days

★ We never know where the Dempster-Dumpster will show up next. On October 9th, 1942, the photograph reproduced above, taken by Acme News-pictures, appeared in the Picture Parade section of the Philadelphia Inquirer. One of our representatives called it to our attention, but we have no idea where the arsenal is located in which the photo was made.

We do know that it is one of the many war equipment plants where the Dempster-Dumpster has proved itself to be so effective in simplifying and speeding-up the movement of materials of all types within and around plant operation. Note the Dempster-Dumpster body labeled—CLEAN GUN STEEL CHIPS. When filled, this loaded body will probably be picked up by an overhead crane and deposited where the Dempster-Dumpster hoisting unit picks it up for transportation and automatic dumping at the proper place.

This same operation, no doubt, is going on at many strategic points throughout the plant—loaded bodies being replaced immediately with empties and probably a lone Dempster hoisting unit and truck handles all bodies. Only one of many regular and special types of bodies is illustrated here. There's a Dempster-Dumpster body produced for handling any type of material, be it liquid, dust, dirt, waste, steel scrap, light or heavy finished parts. With a single truck, equipped with a Dempster-Dumpster hoisting unit, any number of one or several different types of these bodies can be handled, the number depending on plant requirements.

Write for completely illustrated manual showing details of how many industrial plants are simplifying and speeding-up material handling and in so doing reducing their costs tremendously. Dempster Brothers, Inc., 823 Springdale, Knoxville, Tennessee.

DEMPSTER DUMPSTER

MANY *times Longer Life* than Hard Steel Gage Blocks

You can now reduce the cost of maintaining your sets of gage blocks by specifying the use of Dearborn Chromium Plated Standards. Their longer wearing qualities makes them ideal for use on production checking operations. Let us prove to you how industry is reducing gage costs through the use of Dearborn Standards.

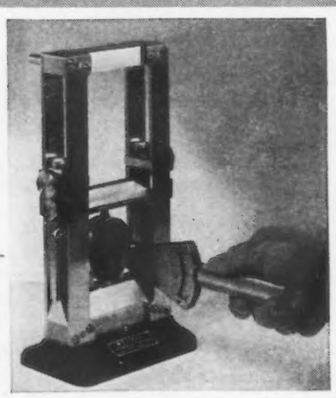
DEARBORN GAGE COMPANY

Originators of Chromium Plated Gage Blocks

22031 BEECH STREET • • • DEARBORN, MICH.

SET YOUR INTERNAL INDICATORS WITH GREATER EFFICIENCY

● This Ellstrom Internal Setting Gage eliminates the old-fashioned, time-wasting method of using clamps and parallels with gage blocks to check internal indicators. For example: if the Ellstrom Gage is adjusted for a 2" reading and a 1.875" reading is desired it isn't necessary to make a readjustment; all that is required is to wring a .125 gage block on the bottom surface of the gage immediately giving you this reading.



workers a 5½c. an hour wage increase retroactive to Jan. 1, 1943. A company spokesman stated that while permission to increase prices had been asked of OPA following the NWLB decision it had not been established whether the company would actually charge the increased rates.

New prices permitted for the company at the governing basing point will be 2.35c. for shapes and 2.40c. for hot rolled carbon bars.

•

Plating Controls Are Issued to Save Metals

Toronto

• • • **Department of Munitions** and Supply announced that the use of nickel, cadmium or any alloy of cadmium, for any type of plating has been prohibited in Canada, except by permit from the Metals Controller. George C. Bateman, Metals Controller, stated that nickel-plated articles will virtually disappear from retailers' shelves for the duration, but nickel plating will be allowed on surgical instruments, hospital supplies, dairy equipment and scientific and electrical control instruments for the armed forces and for industrial use.

No permit will be issued for cadmium plating for ski poles and harness and other non-essential articles, or for ammunition box hardware, wrenches, gages, tools, pressure grease guns, tire irons, brake shoes, typewriters and other office equipment and supplies, motor vehicle and trailer body parts and accessories, light switches, lamps and lamp fittings, furniture of all kinds, stretchers, hospital cots or beds. The same ruling will apply to the making of nuts, bolts, screws, nails and rivets, except when such articles are for use in aircraft, shops, fire control instruments or radio communication apparatus for the armed forces.

•

38 Orders Added For Regional Appeals

• • • **Thirty-eight** WPB orders were added to the list of those which may be appealed only through WPB field offices. At the same time, eight other orders previously on the list were removed. The changes are effected by amendment of Schedule A of Priorities Regulation No. 16 Feb. 17.

The orders removed from the requirements of Regulation No. 16 are

(CONTINUED ON PAGE 122)

Modern inspection by optical projection saves time and money

Jones & Lamson Comparators are available in Pedestal, Bench and other types to meet every need in the field of Inspection by Optical Projection. We shall be pleased to study your problems and apply to them the accumulated experience of more than twenty years in this field.

Profit-Producing Machine Tools

JONES & LAMSON MACHINE COMPANY

SPRINGFIELD, VERMONT, U. S. A.

Manufacturers of: Ram and Saddle Type Universal Turret Lathes · Fay Automatic Lathes · Automatic Thread Grinders · Optical Comparators · Automatic Opening Threading Dies and Chasers.

Photo Courtesy International Business Machines

Helping "Sting" the Enemy into Retreat!

KEYSTONE

Wire

Machine gunners — men from your own plant and your own community — are stinging the enemy into retreat with steely courage. Like them, their supporting equipment is *efficient* . . . clear down to bullet cores and numerous gun parts of wire mill production.

Yes, steel and wire mills, like Keystone, are now straining every facility to speed billets, rods and wire into tools for Victory. These items, in thousands of forms essential to planes, tanks, guns and ships, too, are helping support our fighting forces.

Victory is industry's job No. 1. That job must be *completed* before Keystone can again help equip American assembly lines for efficient CIVILIAN production.

KEYSTONE STEEL & WIRE CO.
PEORIA, ILLINOIS

Just a few of thousands of wire mill products for war uses.

Special Analysis Wire for All Industrial Uses

SAMSON SPRING WIRE
KEYSTONE STEEL & WIRE CO. PEORIA, ILL.

Government Provides New Information Unit

• • • **Business men now have at their disposal a unit of competently trained specialists in Washington whose job it is to answer their questions or refer them to the proper WPB officials.**

The main unit, consisting of a Telephone Inquiry Service, has set up headquarters in Room 1501 Social Security building on Independence Ave. between Third and Fourth Sts., in Washington. The central telephone number is Republic 7500. The Telephone Service Unit has Extension 73011. The Industry Advisory Service can be reached through Extensions 72801, 72802, 72803, 74203, and 74231. Separate liaison services are maintained in Room 304-A in the old House Office building and in 10-B Senate Office building. A third such office is in the Information Center, 1400 Pennsylvania Ave.

Meyers on Raw Materials; Other WPB Personnel Changes

Washington

• • • **Carl W. Meyers,** newly appointed assistant director of the WPB Steel Division in charge of raw materials and facilities, was manager of the Central Alloy District for the Republic Steel Corp. at Canton, Ohio, before coming to Washington.

Mr. Meyers succeeds Frank E. Vigor, who has returned to his position as general transportation manager of the American Rolling Mill Co., Middletown, Ohio.

Other personnel shifts in Washington include that of Brig. Gen. William C. Rose, who was designated last week as chief of executive services, office of the executive director, War Manpower Commission.

Bruce D. Smith, of New York City and Lake Forest, Ill., has been appointed assistant chief of executive services.

84 War Workers Win on Most Valuable Suggestions

• • • **Eighty-four war** workers, representing 33 labor-management committees in 19 states are being picked by War Production Drive Headquarters as winners of national honors for suggestions. The highest distinction went to Walter W. Brown, 67-year-old engineer from Erie, Pa., for a suggestion which saves critical material for Army searchlights manufactured by the General Electric Co.

Now Available

COMPLETE LINE OF STANDARD

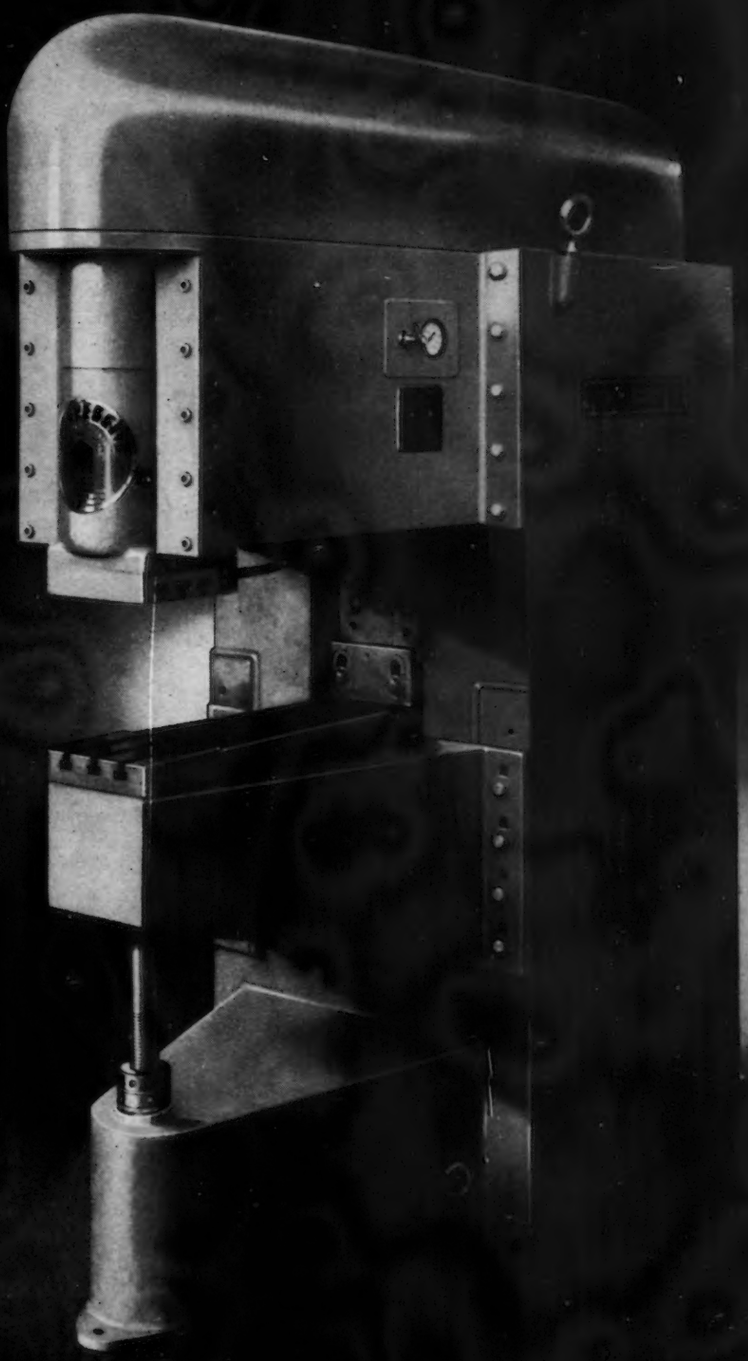
PRESS-WELDERS

by

PROGRESSIVE

32 Models
30 to 600 KVA
Motor Driven or air operated

For Specifications and Description write today for Bulletin No. 601



PROGRESSIVE WELDER CO.

SEAM, PROJECTION & BUTT . . . *Electric Welding Equipment* . . . PORTABLE GUN & PEDESTAL

3050 E. OUTER DRIVE DETROIT, U.S.A.

start

right

URGENCY of production requires precision fit in less time! By peeling Laminum shim adjustments you speed accurate assembly . . . and make possible the same easy adjustments in field service.

Laminum shims (.003 or .002 in. laminations bonded into a solid unit easy to peel) are cut to your specifications.

Stock shim materials obtainable from mill supply dealers. (Write us for sample and illustrated shim application file-folder.)

Laminated Shim Company
Incorporated
76 Union Street Glenbrook, Conn.

it's
LAMINUM
THE SOLID SHIM THAT peels FOR ADJUSTMENT

Crucible Steel Earns $4,864,781 During 1942; Other Income Returns

• • • **Consolidated net profit** of the Crucible Steel Co. of America and subsidiaries for 1942 was $4,864,781, after preferred dividend requirements, equal to $7.26 a share on the common stock, comparing with $7,439,480, or $12.95 a share, in 1941.

Federal income and excess profits tax provisions were $23,923,513, against $14,797,787 for 1941. Including State taxes, provisions for taxes based on income were $24,157,701, against $15,028,095. A reserve of $1,562,138 was set aside for current contingencies out of 1942 earnings.

•

Lukens' Net Income Revealed As $1,172,522

Coatesville, Pa.

• • • **Net income** of the Lukens Steel Co. and its subsidiaries for the fiscal year ended Oct. 10, 1942, amounted to $1,172,522.47, according to the annual report submitted to stockholders Feb. 15 by President Robert W. Wolcott. This income was after allowance of $6,730,000, including $3,900,000 for Federal and state income and excess profits taxes, provision of $2,500,000 for a refund under the war contracts renegotiation law, and a $330,000 reserve for contingencies.

Net income for the 1941 fiscal year, when the allowance for taxes was only $1,695,000, amounted to $2,195,604.50.

•

Warner & Swasey Earnings

• • • **Net earnings** of Warner & Swasey Co., Cleveland, for 1942, after deductions of reserve and Federal income and excess profits taxes, totaled $1,960,848 as compared with $3,939,859 for 1941, according to the company's annual report.

The company's total shipments of turret lathes, tools, parts, etc., for 1942 amounted to $51,626,436 as compared with $34,903,703 for 1941. Provision for federal income and excess profits taxes for 1942 amounted to $16,320,000, of which approximately $1,547,000 is subject to post-war refund compared with $9,920,000 in 1941.

•

• • • **Continental Steel Corp.** and subsidiaries—for 1942: Net profit, $938,852, after $675,000 provision for Federal income tax.

More BEARING Mileage

WITH
STROM
STEEL BALLS

In America's vast war production program Strom steps up its untiring energies to the mastery of one thing. For over a quarter century Strom has concentrated on Metal Balls. Today, through a series of lapping operations, Strom Balls possess a degree of surface smoothness and sphericity that is unequalled in any other regular grade of ball.

Correct hardness, physical soundness and size accuracy in all Strom Balls is assurance of More Bearing Mileage. For longer trouble-free bearing life specify Strom Metal Balls in ALL ball bearings.

Largest independent and exclusive Metal Ball Manufacturer

Strom
STEEL BALL CO.
1850 South 54th Avenue • Cicero, Illinois

4500 Rare Items in Registry of Chemicals

Chicago

• • • A national registry of rare chemicals has been compiled by the Armour Research Foundation to aid war plant research laboratories and others locate quantities of materials.

The registry contains some 4500 items at present and is constantly being increased. The list is concerned only with rare or "odd" chemicals, primarily of the organic type, which are not listed in manufacturers' catalogs.

The foundation reports having handled thus far some 1300 requests. The list does not cover any chemicals which are being produced on a production basis, or even on pilot lines. However, when demand for chemicals produced in that manner becomes so great that difficulty is found in locating supplies, it becomes classified as a rare chemical in the sense that it is difficult to obtain. The registry is purely a clearing house for information. It is under the supervision of Dr. M. H. Heeren.

Defense Plant Corp. Announces New Awards

• • • Defense Plant Corp. has announced the following new contracts for war construction:

Tavares Construction Co., Inc., National City, Cal., additional plant facilities in California, in excess of $535,900, making a total commitment of more than $2,800,000.

International Resistance Co., Philadelphia, plant facilities in Pennsylvania, in excess of $2,000,000.

Nordberg Mfg. Co., Milwaukee, additional equipment for a plant in Wisconsin, in excess of $1,950,000.

Eaton Mfg. Co., Cleveland, additional equipment for a plant in Ohio, in excess of $190,000, making a total commitment of more than $1,700,000.

Square D Co., New York, additional machinery and equipment in a plant in New York, in excess of $630,000.

Luscombe Airplane Corp., West Trenton, N. J., additional plant facilities in New Jersey, in excess of $150,000.

Timbeam, Inc., Detroit, plant facilities.

•

Alcoa Issues New Book Covering Welding and Brazing

Pittsburgh

• • • The Aluminum Co. of America has completely rewritten its welding book edition, and in addition to welding has incorporated the art of brazing aluminum. Copies of this new booklet are available free of charge by writing to the Aluminum Co. of America, Pittsburgh, Pa.

A feature of the manual is a two-page spread in color showing the various flame adjustments for torch welding and brazing aluminum.

1853

1898

90 YEARS

OF FAITH

in the American System

IN 1853 a young man, believing in the sound principles of the American Free Enterprise System, started making wagons and carriages. Adhering to these principles, his business grew. He incorporated in 1888.

With unlimited faith in the American System, this growing Cleveland Company began the manufacture of electric vehicles in 1898. In 1901, the Baker Electric Torpedo startled the world with a record speed of 104 miles per hour. This same year, Baker built the first shaft-drive automobile. In 1911 Baker contributed the worm-gear drive. In 1917, foreseeing our great industrial development, Baker went into the business of making industrial power trucks. Thousands of these trucks are today speeding production and the handling of material all over the world. A second Baker plant builds commercial truck bodies to meet the specific requirements of public utilities.

Today we are at war. Along with other American industries, The Baker-Raulang Company has enlisted for the duration. Both plants are engaged 100% in war production. At the same time we are looking forward to playing our part in the rebuilding of peacetime industry, as we have done three times before in our history.

After 90 years—during which we survived more than a dozen major depressions, we still have faith in the System of Free Enterprise which has built the world's greatest nation—a nation capable of saving the world from despotism, through industry. We trust in the common sense of the American Public to justify our 90 years of faith—to keep America free for the rebuilding job in the critical years ahead.

THE BAKER-RAULANG COMPANY

UTILITY BODY DIVISION
1280 WEST 80th STREET

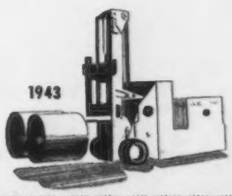
★

INDUSTRIAL TRUCK DIVISION
2168 WEST 25th STREET

CLEVELAND, OHIO

1943

UTILITY BODIES
Baker
INDUSTRIAL TRUCKS


1943

Cited for Award

• • • **The following companies** have recently been awarded the Army-Navy "E" or a renewal of the "E" for outstanding war production:

International Nickel Co., Huntington Works, Huntington, W. Va. (third star).
Wyckoff Drawn Steel Co., Ambridge, Pa., and Chicago (second star).
Grumman Aircraft Corp., Bethpage, L. I. (star).
Handy & Harman, Bridgeport, Conn. (star).
Oil Well Supply Co., Imperial Works, Oil City, Pa.
Illinois Gear & Machine Co., Chicago.
Elliott Co., Jeannette, Pa.
Philco Corp., Philadelphia (star).
Greenfield Tap & Die Corp., Greenfield, Mass. (star).
Westinghouse Elec. & Mfg. Co., East Springfield, Mass.
Aircraft Accessories Corp., Burbank, Cal.
Airesearch Mfg. Co., Los Angeles.
Allenport Plant, Pittsburgh Steel Co., Allenport, Pa.
American Sterilizer Co., Erie, Pa.
American Tube & Stamping Division, Stanley Works, Bridgeport, Conn.
Ames Street Plant, United-Carr Fastener Corp., Cambridge, Mass.
Arlington Mills, William Whitman Co., Lawrence, Mass.
F. H. Bickford Co., Dayton, Ohio.
Bridgeport Plant, Dictaphone Corp., Bridgeport, Conn.
Brookside Mills, Knoxville, Tenn.
Carnegie Works, Columbia Steel & Shafting Co., Carnegie, Pa.
Clark Brothers Co., Inc., Olean, N. Y.
Cleveland Plant, Lucas Machine Tool Co., Cleveland.
Colonial Radio Co., Buffalo.
Coosa River Ordnance Plant, Brecon Loading Co., Talladega, Ala.
East Peoria Plant, Caterpillar Tractor Co., East Peoria, Ill.
Faichney Instrument Corp., Watertown, N. Y.
Farnsworth Television & Radio Corp., Marion, Ind.
LaPlant Choate Co., Cedar Rapids, Iowa.
Lone Star Ordnance Plant, Lone Star Defense Corp., Texarkana, Texas.
Mahoney-Troast Construction Co. and associated sub-contractors, Plant No. 7 Project, Wright Aeronautical Corp., Wood-Ridge, N. J.
Maumelle Ordnance Plant, Cities Service Defense Corp., Little Rock, Ark.
Metlab Co., Philadelphia.
Mohawk Carpet Mills, Inc., Amsterdam, N. Y.
Monessen Plant, Pittsburgh Steel Co., Monessen, Pa.
National Tool Co., Cleveland.
New York City Plant, National Biscuit Co., New York.
Packard Mfg. Corp., Indianapolis.
Philadelphia Textile Finishers, Inc., Philadelphia.
Plants No. 1 and No. 2, Magna Mfg. Co., Inc., Haskell, N. J.
Saco Lowell Shops, Biddeford, Maine.
St. Croix Garment Co., Stillwater, Minn.
Stanley Tools Division, Stanley Works, New Britain, Conn.
Tractor Works, International Harvester Co., Chicago.
Universal Camera Corp., New York.
West Pullman Works, International Harvester Co., Chicago.
Edward Weck & Co., Inc., Brooklyn.

MARITIME COMMISSION "M"

Federal Shipbuilding & Dry Dock Co., Kearny, N. J.
Marinship Corp., Sausalito, Cal.
Bethlehem-Sparrows Point Shipyard, Inc., Baltimore.
Sun Shipbuilding & Dry Dock Co., Chester, Pa.
Turl Iron & Car Co., Inc., Newburgh, N. Y.
Kelvin & Wilfrid O. White Co., Boston.
L. Thiess & Sons Corp., Maspeth, N. Y.
Sumner Iron Works, Everett, Wash.
Ft. Pitt Steel Casting Co., McKeesport, Pa.
Hesse-Ersted Iron Works, Portland, Ore.
Dri-Steam Products Co., Inc., New York.
Edwards & Co., Inc., Norwalk, Conn.
Edward Valve & Mfg Co., Inc., East Chicago, Ind.
Jenkins Bros., Bridgeport, Conn.
National Tile & Marble Co., New York.
Radiomarine Corp. of America, New York.
W. & J. Sloan, New York.
Steves Sash & Door Co., San Antonio, Texas.
Iron Fireman Mfg Co., Portland, Ore.
Lewis Bolt & Nut Co., Minneapolis.
Paxton-Mitchell Co., Omaha.
Union Steam Pump Co., Battle Creek, Mich.
Mine Safety Appliance Co., Pittsburgh.
Sterling Casting Foundry, Braddock, Pa.
Bethlehem-Fairfield Shipyard, Inc., Baltimore (third star).
Houston Shipbuilding Corp., Houston, Texas (second star).
North Carolina Shipbuilding Co., Wilmington, N. C. (fourth star).
Oregon Shipbuilding Corp., Portland, Ore. (ninth star).
Permanente Metals Corp., Richmond Shipyard No. 1 (fifth star), and Richmond Shipyard No. 2 (fourth star), Richmond, Cal.
California Shipbuilding Corp., Wilmington, Cal. (seventh star).

Trends of the Times: Notes on Absenteeism

• • • A House Naval sub-committee at Washington reported last week that manhours lost because of absenteeism totaled 12,700,000 in the shipbuilding industry in one month alone (last December). This compares with only 170,000 manhours lost as a result of strikes in shipyards in all of 1942.

LAST WEEK ALSO, 150 ship welders were discharged at the Fore River yard of Bethlehem Steel Co. for continued absenteeism. Their names have been submitted to draft boards for reclassification into 1-A.

Records showed that of the 150 fired, 55 were absent from work 30 to 40 days in periods of three and six months; 33 were absent 40 to 55 days; 15 more were off than 50 days; one man lost 89 days in six months and another 71 days in three months. The remainder lost from eight days in one month to 30 days in three months.

AND at Philadelphia, several draft boards announced that shipyard absentees would be classed with draft evaders, subject to immediate reclassification in 1-A and hence liable for active service.

More Steel to Be Used in New Gondolas

• • • **Overall steel requirements** in the newly designed gondola cars which have wooden sides and ends are said to be using a greater tonnage of steel than the standard steel sided cars. Furthermore, the difficulty in getting lumber is reaching the point where construction is being held up.

If the WPB's purpose was to save steel plates for other uses by substituting wood for sides and ends on gondolas, the plan has been a success. However, if the change was made on the overall basis of saving steel in the total weight of the car, the project has been one of robbing Peter to pay Paul because the total weight of most of the newly designed gondolas is almost a ton greater than the steel used in the standard car.

More steel shapes are needed because of a heavier underframe and supports which are required to offset the use of wooden sides and ends. On the standard steel design, the steel sides took care of some of the strength requirements. It is true, however, that shapes have been easier than steel plates, and since the design with the wooden sides requires more shapes and less plates than the standard steel design, the amount of plates has been reduced.

Generally, the tone of WPB substitution pronouncements has been sung to the tune of saving steel regardless of what kind of steel or in what form. Quite a few composite freight cars have been approved by WPB recently, a large portion of them being in the class mentioned above. The WPB has flatly refused to allow steel plates to be used on the sides of these cars, even though it was pointed out to them that the new design would in the overall require more steel than the former all-steel gondola.

•

Lukens Chief Calls for More Railroad Materials

New York

• • • **The record** of the nation's railroads in 1942 constituted "one of the outstanding achievements of the war effort," Robert W. Wolcott, president of Lukens Steel Co. declared Feb. 8 in an address before members of the New York Railroad Club. At the same time, he expressed the hope that the federal government would be able to allocate materials and equipment needed for the carriers to handle the larger volume of traffic they are expected to carry in 1943.

Briefly Told—

New Aluminum Foundry; Chile Will Roll Steel; Other Industrial News

• *Willard Storage Battery Co.'s new aluminum foundry at Dallas went into production recently. The foundry is not part of the battery plant, being an entirely separate function devoted exclusively to aluminum castings for aircraft. Production at present is several hundred heat-treated aluminum castings per hour, very near the capacity of the plant. A large percentage of the products of this foundry will go to North American Aviation, Inc., builders of the B-25, the heavy bombers that raided Tokyo.*

•

• **Approximately 40 per cent of the rolled-steel required to meet Chile's national consumption will be produced by the Compañia Eléctro-Metalúrgica e Industrial de Valdivia when present plans become operative. The Production Development Institute will invest 48,000,000 pesos in bonds in the enterprise, the capital to be used to double the output and reduce production costs.**

• **When WPB asked** the New England Alcohol Co., Everett, Mass., to build a plant to make grain alcohol, engineers, draftsmen, purchasing agents and all the plant personnel dug in and worked seven days a week until the plant was ready to go. Scrap yards, junk piles, and second hand dealers' warehouses yielded most of the equipment used in the conversion, and only $2400 worth of vital materials were bought, consisting mainly of electrical wiring. The plant went into operation in just one month from the start of the activity.

•

• *Dr. Edward L. Mack, director of research and development for the Reynolds Metals Co. has been granted two United States patents covering an improved type of fastening device for aircraft. In designing the new fastening, full consideration was given to the greatly increased stresses and the complex vibrations which have necessarily accompanied the introduction of larger engines. It is expected that quantity production will start on this important item within a short time.*

•

• **In its effort** to speed up the wartime mine-to-metal cycle, the Bureau of Mines has published a circular describing recently developed methods for the manufacture of basic refractories used in steel making from high grade dolomite deposits found in several Eastern states, according to Dr. R. R. Sayers, director of the Bureau.

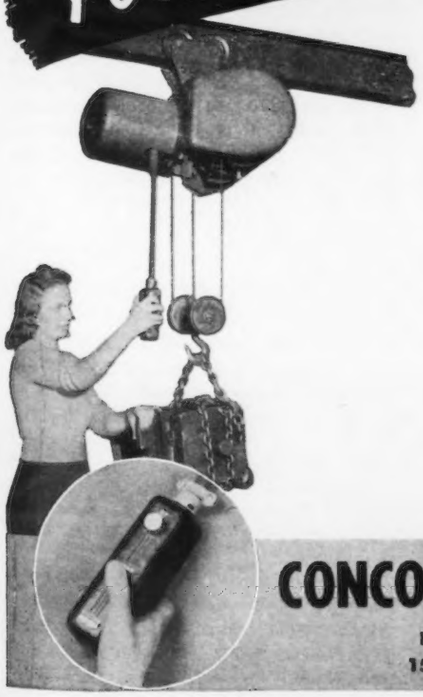
•

• **At a recent meeting of the American Physical Society in New York, Dr. Harvey C. Rentschler, director of research for the lamp division of Westinghouse Electric & Mfg. Co., Bloomfield, N. J., explained his discovery that gas dissolves in certain metals just as salt dissolves in water. This discovery may lead to the production of longer lasting electronic tubes which will require less power to operate.**

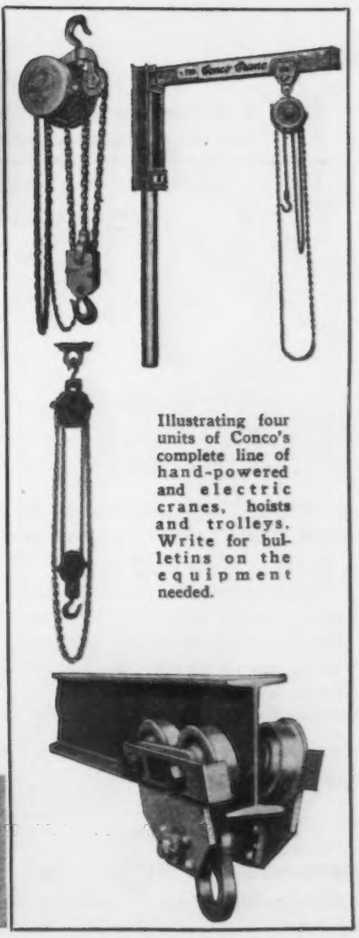
•

• **A special telescopic** industrial elevator has been built and delivered to an Army airport, by Revolvator Co., Bergen, N. J. With an extreme lift of 54 ft., the five telescoping sections

Here's Safe Easy Strength... FOR THE WEAKER SEX



The Conco Torpedo Electric Hoist has many features which adapt it ideally to operation by women. First, push button control allows for easy, one-hand operation. Double cast iron drums balance the load with a minimum of effort from the operator. An electric brake and positive limit switch are important safety features. Available for prompt delivery in 250-, 500- and 1000-lb. capacities for hook, bolt or trolley suspension. Write for bulletins.



Illustrating four units of Conco's complete line of hand-powered and electric cranes, hoists and trolleys. Write for bulletins on the equipment needed.

CONCO ENGINEERING WORKS

Division of H. D. Conkey & Company

15 GROVE STREET, MENDOTA, ILLINOIS

collapse to a height of 11 ft. 9 in. The elevator is readily portable on ball bearing casters and may be steered from either end.

•

• *Under the guidance of WPB, the armed services are working out a series of agreements to assure the use of single sets of specifications in the production of component parts for radio and electronic equipment for the Army and the Navy, WPB announced last week.*

• **The largest single order** for conveyor belt ever written in the history of the rubber industry, totalling more than 66 miles, has been awarded to The B. F. Goodrich Co. The belt, part of a huge war order, will require 50 standard railroad cars when shipped.

•

• **The Northeastern Ohio Foundries have completed arrangements for their apprentice contests in molding and patternmaking. Contests will be held in three divisions, gray iron, steel and non-ferrous. Contestants will receive no outside help and their work will be supervised by members of the apprentice training committee.**

•

• **War Bonds** to the extent of $650 have been awarded in a nationwide contest upon salvaging and maintaining machinery under wartime conditions. Sponsored by Metallizing Engineering Co., Inc., Long Island City, N. Y., this is the second of a series of similar contests open to users of any metal spraying equipment in the United States and Canada.

•

• *Heinz & Munschauer, Buffalo, which has been engaged on war contracts, has suspended manufacturing operations and filed a voluntary petition in bankruptcy in federal district court. The 77-year-old firm made bath tubs, ice boxes and bird cages before switching to war work a year ago, when it was sold to a group headed by Alva F. Epting, who came from Charlotte, N. C. Assets and liabilities will be filed later.*

•

• **Outstanding authorities** in the field of powder metallurgy and paints and paint materials will present technical papers and discussions in two technical symposiums during the 1943 spring meeting of the American Society for Testing Materials being held in Buffalo at Hotel Statler on March 3.

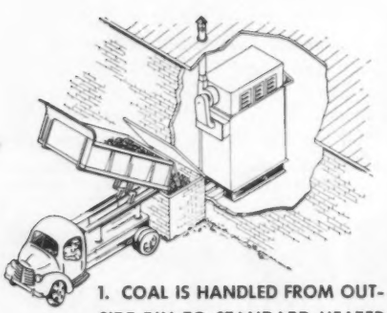
•

• **Development of a process of chrome-plating and reboring cylinders on a war product being produced by the Westinghouse Electric & Mfg. Co., East Springfield, Mass., enabled the plant to reclaim 203 cylinders, save 1400 lb. of critical material and more than $1,000 in a three-month period. The requirements of accuracy in size and smoothness of finish of the bore in these cylinders formerly resulted in a considerable scrap loss.**

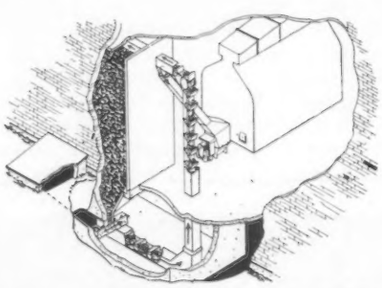
•

• *More than 400,000 tons of steel were saved in 1942, according to Harvey A. Anderson, deputy director of WPB's Conservation Division, by use of the steel-ringed connector to increase the strength of joints in wood construction. The connectors are pressed steel rings or malleable iron plates ranging from 2½-in. to 6-in. in diameter. Placed in circular grooves between adjacent faces of overlapping timbers, the rings provide a larger supporting area than that attained by other methods of joining timber.*

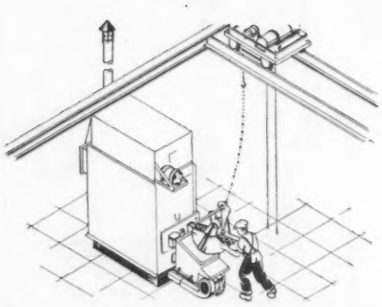
...how to use Economical direct fired Heating when coal is the available fuel



1. COAL IS HANDLED FROM OUTSIDE BIN TO STANDARD HEATER



2. COAL IS LOADED IN STORAGE BIN, EMPTIED AUTOMATICALLY TO STOKER HOPPER



3. HANDLING COAL IN CLAMSHELL BUCKET FROM SHOP CRANE TO STOKER HEATER

HEATING industrial plants by means of direct fired warm air heaters fueled with gas or oil has long been an accepted, economical practice. Now Dravo coal fired models also are available for automatic bin, hopper or conveyor feed; hard or soft coal; output 1,000,000 to 8,000,000 B.t.u. per hour. The accompanying drawings show three convenient methods for feeding coal to the stoker.

1. Bin feed stoker, with adequate storage bin constructed outside building wall, accessible to coal truck.
2. Interior storage bin, loaded from outside of building, with bucket conveyor and gravity feed to hopper type stoker (for large capacity units).
3. Regular shop crane and clamshell bucket used to load standard hopper feed model.

Those considering new buildings to be heated with coal, or conversion to coal heat of existing structures, are welcome to copies of Dravo booklets 505 and 506.

DRAVO CORPORATION

Heater Department

DRAVO BUILDING PITTSBURGH, PA.

Fifty-five Sales Offices in Principal Cities

DRAVO DIRECT FIRED HEATERS

WPB Reorganization to Have Two Phases, Childress Says

Cleveland

• • • **Wade Childress,** deputy director general of field operations for WPB, commented briefly on the reorganization program that is now under way in the WPB in Washington.

First, he said, it is expected that there will be an extensive shifting around within WPB of its various units, placing them under different division direction so that their operations become more efficient.

Second, a more extensive decentralization of WPB authority to the 12 regional offices has been recognized and put into force. All construction up to $10,000, under Form PD-200 will be handled directly by the regional offices after March 8. All PD-1A forms, which are related to equipment and supplies for war contractors, will be handled by the regional offices, effective March 1, he said. Applications for such materials are screened through the regional offices over a period of six weeks, providing time for the regional offices to absorb this work.

PAW Opposed on Second "Big-Inch" Line

Washington

• • • **The Petroleum Administration** for War has met with strong opposition to its recommendation for the construction of an 836-mile gasoline-light petroleum products pipeline from Texas to Norris City, Ill., and Seymour, Ind., with the result that plans for the project have been held up pending an inquiry by the Truman Senate Committee Investigating the National Defense. The line would require 160,000 tons of seamless steel pipe, of which 144,800 tons would be 20-in. in size and the remainder 16, 12 and 10-in. pipe.

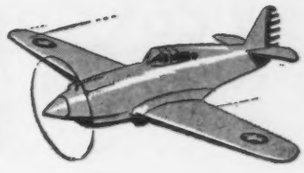
Opposing the line are midwest refiners, some of whom are members of Petroleum Administrator Harold L. Ickes' District No. 2 Advisory Committee. Supporting them is a powerful bloc of senators, most of them from the midwest.

Specifically the row centers around the question of whether the first leg of the line should be built from Texas to Illinois, as PAW proposes, or whether the line should be built from Illinois to the East and fed by midwest refiners as the latter proposes.

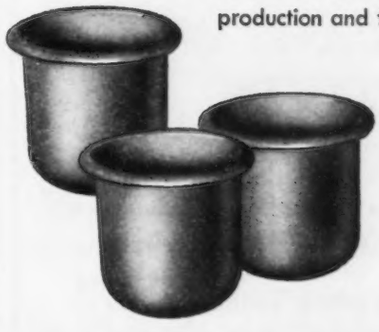
The halt in the plans came after DPC, upon the recommendation of PAW, had agreed to finance the line, and had entered into a contract with the War Emergency Pipelines, Inc., for its construction at a cost of about $44,000,000. It would have a daily capacity of approximately 235,000 barrels of gasoline and light petroleum products. It was expected that it could be in operation in about seven months.

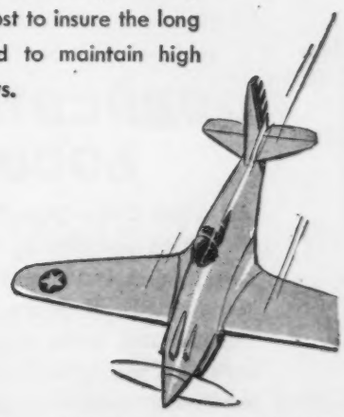
Originating from a point near Baytown, Tex., the line would be a 16-in. line to the Beaumont-Port Arthur area, and from there will be extended as a 20-in. line to Norris City and Seymour. It will parallel, between Little Rock, Ark., and Norris City, the 24-in. line also financed by DPC and constructed by the War Emergency Pipelines, Inc., from Longview, Tex., to Norris City. Feeder lines would run to the principal refineries in the Beaumont-Port Arthur and Houston-Texas City areas. The facilities would be owned by DPC and operated for its account.

FOR THE MOTORS THAT POWER OUR FIGHTING PLANES



● No part in the production of combat equipment can be considered lightly. In the construction of the modern and efficient engines that power many of our fighting planes the special bronze bearings are poured in MICHIANA Pots. While this is a relatively small part, we at MICHIANA are proud of the responsibility and ready to do our utmost to insure the long heat-hour service needed to maintain high production and few delays.





MICHIANA PRODUCTS CORPORATION
MICHIGAN CITY, INDIANA

MICHIANA
Heat-Resistant and Corrosion-Resistant ALLOY CASTINGS

• Muffles • Retorts
• Boxes • Pots
• Rails • Grids
• Rolls • Tubes

• Sprockets • Chains
• Heat-Resistant and Corrosion-Resistant Castings of All Kinds

Priorities

(CONTINUED FROM PAGE 112)

L-5-c, L-6-c, L-78, L-83, L-84, L-91, L-108, L-131.

Schedule A now contains:

L-18-b
L-18-c
L-21
L-21-a
L-22 (Letter)
L-23 (PD-203)
L-23-a
L-23-b
L-23-c
L-27 (Letter)
L-27-a
L-29
L-30-a
L-30-b
L-30-c
L-30-d
L-33
L-36
L-42 (Letter)
L-49
L-59
L-59-a
L-59-b
L-62
L-64
L-64-a
L-73
L-74 (Letter)
L-77
L-79 (Letter)
L-80
L-81
L-92
L-93
L-98
L-104
L-135
L-136
L-142 (Letter)
L-150 (Letter)
L-150-a (Letter)
L-150-b (Letter)
L-152 (PD-417)
L-157 (Letter)
L-161
L-165 (Letter)
L-173 (Letter)
L-179 (Letter)
L-185 (Letter)
L-187
L-199 (Letter)
L-205 (Letter)
L-218
L-225
L-229 (Letter)
L-236 (Letter)
M-11-b
M-83 (Letter)
M-192 (Letter)
M-126
M-177 (Letter)
M-208 (Letter)
M-209 (Letter)
M-248 (Letter)

Appeals for relief from the restrictions imposed by the above orders must be filed with the appropriate WPB field office on form PD-500, except where otherwise indicated.

Appeals from orders not included in Schedule A should be mailed directly to WPB in Washington. If no particular form is specified, the appeal should be made by letter, in triplicate (marked Ref: L or M Order No...), stating in detail the grounds for the appeal.

•

Building Repair Defined

Washington

• • • A **revised definition** of what constitutes maintenance and repair of a building is contained in an amendment to order L-41, which was made effective Feb. 20. The new definition specifically designates that where a single job is partly maintenance and repair and partly new construction, the whole project will be considered new construction and subject to conservation order L-41.

In addition, the amendment reduces to $200 new construction which may be undertaken, without specific authority, for non-essential work.

•

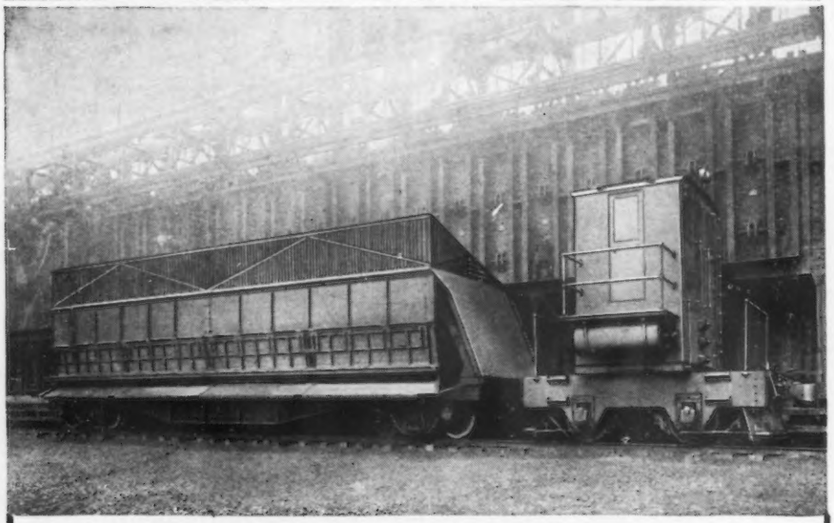
Valve Order Relaxed

• • • **Control valves,** liquid level controllers, and pyrometers and resistance thermometers are simplified and standardized by General Limitation order L-272, issued Feb. 22 by WPB. The order overlaps order L-134, which restricts the use of chromium and nickel in the manufacture of control valves. Order L-272 simplifies and standardizes designs and types in order to step up production. Where the orders conflict, the less restrictive will govern, thus suspending some of the restrictions of L-134 in the interest of higher production.

COMING EVENTS

March 10 to 12—Grinding Wheel Manufacturers Association and Abrasive Grain Association, Buffalo.
March 18—Joint Meeting Engineers Club and American Society for Metals, St. Louis.
March 25 to 27—American Society of Tool Engineers, Milwaukee.
April 7 to 10—Electrochemical Society, Pittsburgh.
April 12 to 16—American Chemical Society, Detroit.
April 28 to 30—American Foundrymen's Association, St. Louis.

COKE OVEN EQUIPMENT



QUENCHING CARS AND LOCOMOTIVES

All Atlas Coke Oven Equipment is of heavy-duty construction permitting the peak operating conditions required in today's stepped-up production schedules. As a result of years of experience, Atlas is able to design and build equipment, to meet the requirements of each particular coke plant. Detailed information available on request.

Other ATLAS Products

Ore Transfer Cars
•
Scale Charging Cars
•
Electrically Operated Cars for Every Haulage Purpose

Locomotives for Switching and Interplant Haulage
•
Turntables

The ATLAS CAR & MFG. CO.

ENGINEERS MANUFACTURERS

1100 IVANHOE RD. CLEVELAND, OHIO, U. S. A.

OPA Establishes Dollar and Cents Ceiling on Castings

Washington

• • • **A saving** estimated conservatively at $50,000,000 this year will accrue to the government under an OPA order issued Feb. 21 cutting back by 10 per cent to 25 per cent the maximum prices for most of the steel castings used in ships, tanks, guns and planes. After examination of the 1942 earnings of steel castings manufacturers it was revealed that profits on sales were running from three to five times as large as in the four years 1936 through 1939. Officials said further price reductions may result.

During the past few months, it was stated, armor casting prices have been reduced voluntarily by the industry and, in the case of the heavier cast armor turrets, are near the new ceilings set by OPA.

The price reduction is effected by establishing specific cents per pound ceiling prices, on a delivered basis, for four classes of steel castings: armor, ordnance, navy and ship and marine. Technically, the reduction is brought about by Amendment No. 4 to Revised Price Schedule 41—Steel Castings, and becomes effective Feb. 26.

Change in prices of the four groups of castings is made through assigning the castings to different price schedule series and quantity discount differential brackets in the Comprehensive Report of the Steel Founders Society for the third quarter of 1941. Where specific prices for the castings to be priced do not appear in that report they will be found in a table incorporated in the amendment.

Special prices previously established by filing a cost estimate and proposed price on an appropriate form under Paragrah 1306.112 (b) (2) of the regulation are retained.

Thirty days are given from the effective date of the regulation to make deliveries at the former prices of steel castings bought at those prices before the reduced prices became effective.

•

Frozen Tinplate Defined

Washington

• • • **The term "frozen"** as applied to can materials in Conservation Order M-81, as last amended on Feb. 18, is defined by Interpretation No. 1 of the order, issued on Monday by WPB. Under the order as amended on that date, can manufacturers may use "frozen" tinplate, terneplate, or blackplate for producing ends for fibre bodied paint cans, for ointment and salve boxes, and for other specified containers.

The interpretation makes it clear that "frozen" tinplate, terneplate or blackplate means material which, since Dec. 9, 1942, has been held.

1-Billion Saved on Contract Renegotiation

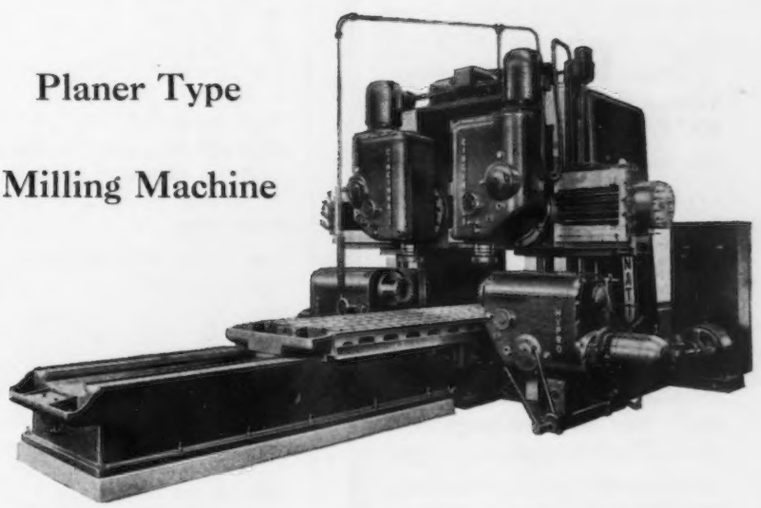
Washington

• • • **The War Department** announced last Saturday that price reductions and cash refunds obtained through contract renegotiation amounted to $1,045,000,000 during the nine months ended Jan. 31. The saving equals 12 per cent of the $8,600,000,000 value of contracts renegotiated and repriced.

Cincinnati Hypro

Planer Type

Milling Machine



Rail and Side Milling Heads of the Cincinnati Hypro Planer Type Miller are completely self contained units. The spindle of each head is powered by an individual motor.

The Hypro Combination Herringbone Table Drive delivers a smooth, straight-line flow of power to the table during all milling operations.

Cincinnati Hypro Planer Type Millers are manufactured in sizes from 36″ to 120″ in 7½″ or 9½″ Quills.

Write for Bulletin 105.

PLANERS · PLANER MILLERS · BORING MILLS

THE CINCINNATI PLANER CO.

CINCINNATI, OHIO

ADD this extra MANPOWER TO YOUR STAFF

By Using Dependable

OAKITE WARTIME SERVICE

Thousands of war plants today are taking advantage of Oakite Technical Service because it provides a direct means of adding EXTRA manpower to their production and maintenance staffs . . . entirely without cost to them.

Whatever your degreasing or cleaning problems, whether they are related to the preparation of war supply items for inspection, assembly and finishing, or the maintenance of essential plant equipment and machinery . . . this EXTRA manpower is at your service ready to render practical, personal assistance in helping you solve them.

3 Data Manuals FREE!

Three data manuals . . . free to production men who want to speed-up volume on war orders and conserve man-hours on plant maintenance . . . concisely describe successful methods and short cuts used in plants the Nation over. Write for YOUR copies today!

OAKITE PRODUCTS, INC.
30H Thames Street, New York, N. Y.
Technical Service Representatives Located in All Principal Cities of the United States and Canada

OAKITE Buy Bonds for Victory
Specialized cleaning
MATERIALS & METHODS FOR EVERY CLEANING REQUIREMENT

Benefit of African Manganese to U.S. Questioned by Some Importers

New York

• • • The fringes of Africa from which the United Nations have been receiving iron and manganese ore shipments throughout the war, were extended to an important degree with the occupation of French North Africa. Under the arrangement said to have been made by the Combined Raw Materials Board of Britain and the United States, Britain will receive the iron ore (together with zinc and lead ores, pyrites and phosphates) and the United States will get the manganese and cobalt ores.

How important the manganese exports will be is questioned here. In fact some experts doubt if there is much there at all. The ore is said to be fairly widely distributed over all of North Africa, with French Morocco the only major producer. It is reported that in each of the last two years more than 100,000 tons of ore have been produced, but opinion among some ore importers in this country is that the shipment of any such quantities, though gratifying, would be surprising.

The iron ore deposits have been exploited actively for some years and are extensive. In 1938, more than 4,000,000 tons were produced, of which 3,000,000 came from Algeria, 800,000 from Tunis and 266,000 from French Morocco. Large amounts were France. It has been reported that a blast furnace was being erected at Casablanca to facilitate treatment of the ore on the spot, but it is not known how far the project has gotten.

Immediately after the occupation of Casablanca, the Board of Economic Warfare brought two shiploads of ore from that city to this country. It is reported to have been of rather poor quality, high in phosphorus and, in the absence of buyers, to have been stored at Philadelphia and Richmond.

From two other African sources, Britain and this country have been receiving iron ore. Shipments from Sierra Leone, on the western hump of the continent, amounting to about 1,000,000 tons a year, have been going to England. This ore used to go to Bethlehem Steel Co., which had been planning to use it until its mining project in Venezuela was ready for operation. The Venezuela ore, which will be shipped to Trinidad, reloaded, and brought to Sparrows Point and Philadelphia, probably will begin moving in two years.

The other African iron ore source throughout the war has been Sinai, Egypt. The high grade, manganiferous Sinai ore has been coming to this country by way of the Cape of Good Hope, a voyage of two or two and a half months, although Sinai is only about 80 miles from the Suez Canal. Nevertheless, the ore, moving at ballast rates, has in at least some cases reached Philadelphia at a lower cost than ore from the Lakes.

These Sinai shipments, of which there were never very many, are said to be decreasing because of the diversion of eastward-bound supply ships to North Africa and away from the Middle East. It is also reported that ships are shortening their stays in port to a maximum of about 38 hours, which frequently allows only enough time to take on sand or water ballast.

Manganese shipments have been coming to this country from the Gold Coast and from Rhodesia. Shipments of the Rhodesian manganese, which had been on a restricted scale for about three months, were increased about six weeks ago, is is reported.

As for other metals, the output of lead which Britain is to receive is said to amount to about 24,000 tons of ore a year, mostly produced in Tunis. Algeria accounted for 8,000 tons of zinc ore in 1937, French Morocco about 5,000 tons, and Tunis 800 tons. Both lead and zinc ore production can be stepped up, as output had declined considerably before the war.

One of the eight sizable molybdenum sources of the world is at Avegour, French Morocco, and England will presumably receive its output. (See THE IRON AGE, Oct 1, p. 104).

The North African area also produced a useful tonnage of quicksilver, production of which expanded in Tunis and Algeria two and a half times between 1936 and 1938, when total output was about 36,000 lb.

Car Accessories Order

Washington

• • • **Because surplus supplies** of car part inventories have not been used as rapidly as WPB wished, freight car builders on Tuesday were required to use excess accessories to reduce inventories in an amendment to order L-97-A.

PERSONALS

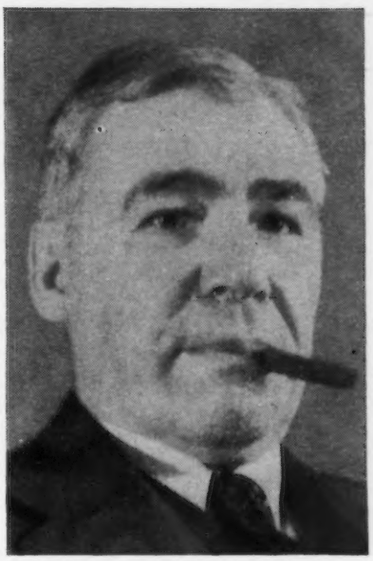
• **William B. Robinson,** Pittsburgh district advertising manager, who has been associated with THE IRON AGE for the past 33 years, has retired. Mr. Robinson, who was generally known throughout Pennsylvania, Western New York, and Eastern Ohio, as "Big Bill," and "Robbie," started to work for THE IRON AGE as Philadelphia manager early in 1910, and later was given management of both the Philadelphia and Pittsburgh offices in charge of advertising. In 1913, he gave up the Philadelphia end of his work, and since that time, has devoted his energies to the Pittsburgh office, covering such territories as Western Pennsylvania, West Virginia, and part of Eastern Ohio. Mr. Robinson entered the business paper field in 1905, when he was sent to Pittsburgh as local editor and business manager of *The Iron Trade Review.* He left the editorial part of the work in 1907 to devote all his time to advertising. For the past few years, Mr. Robinson's health has been impaired to some extent, and at present he is living on his farm at Wildwood, Penna.

• **Albert H. Eggers,** vice-president and machine-tool sales manager of Greenlee Brothers & Co., Rockford, has been named president of the company to succeed **George C. Purdy,** who becomes chairman of the board. **Leslie H. Geddes,** assistant sales manager in charge of screw machine sales, has been named second vice-president of the company. **O. Vincent Haegg** succeeds **Albert E. Alverson,** as secretary of the company, who has retired after 42 years of service with Greenlee.

• **Joseph D. Stites** has been named manager of the Wickwire Spencer Aviation Co., new subsidiary of the Wickwire Spencer Steel Co. Mr. Stites has been with the parent company for several years in an engineering capacity. For the past two years he has devoted his time almost exclusively to developing the new propeller.

• **Gunnar B. Taube,** heretofore chief plant engineer at the Warren City Tank & Boiler Co., a branch of the Taylor Winfield Corp., has been appointed superintendent of the Cardox Corp. plant manufacturing its airport fire trucks.

• **R. C. Garvey,** assistant district sales manager for the past two years, has been made district sales manager at San Francisco for Jones & Laughlin Steel Corp. to succeed **C. P. Hensley,** who retired Jan. 1. **E. S. Holden** has been appointed resident manager of Jones & Laughlin at Denver succeeding the late R. H. Galbraith.



W. B. Robinson, THE IRON AGE's Pittsburgh advertising manager, who has retired.

• **Mary M. Donovan,** former graduate assistant at the University of Pittsburgh, has been appointed to the technical staff of Battelle Memorial Institute, Columbus, Ohio, and assigned to its division of physics research.

• **John M. Davies,** in the research division of the B. F. Goodrich Co. since 1926, has been named director of physical research.

ALBERT H. EGGERS, new president of Greenlee Bros. & Co., Rockford, Ill.

• **Oscar E. Kiessling** newly elected secretary of the Machinery and Allied Products Institute, succeeding **George Terborgh** who has been advanced to the position of research director. Mr. Kiessling has had 15 years' experience in research and administration with the United States Bureau of Mines, the National Research Project, and the Bureau of the Census, having been since 1939 Chief of the Mineral Industries Division of the Census. Mr. Terborgh, the new research director, was senior economist with the Federal Reserve Board prior to his appointment as MAPI Secretary in July, 1941.

• **Dr. P. W. Leppla** has been appointed chief chemist of the Research Division of the Cardox Corp., Chicago. In the Research Division Dr. Leppla will engage in development work in support of the three other divisions of the company: Mining, gas and fire.

• **Jack Sandler** has joined the staff of Aircraft Parts Development Corp., Summit, N. J., as chief plastics engineer. Mr. Sandler's former activity in plastics engineering was with the Northern Industrial Chemical Co. and the Nixon Nitration Works.

• **William R. Jackson** has been named secretary-treasurer of Pittsburgh-Des Moines Steel Co., succeeding **George A. Smith,** who is retiring from the company after 44 years of active service. **R. J. Jackson** has been appointed assistant secretary-treasurer, and **A. B. Sanderson** has been elected a director of the company.

• **Col. W. E. Niles** has been appointed executive officer of the Ordnance Department's Tank-Automotive Center, Detroit. Simultaneously the creation of four product divisions within the office of the assistant chief has been announced. The four product directors are: **Henry H. Howard,** tanks and combat vehicles; **Col. E. S. Van Dusen,** transport vehicles; **Col. Graeme K. Howard,** parts and supplies; **C. B. Smith,** tools and equipment. **Valerius Kendall** has been transferred from the post of director of parts and supplies to that of directing the Tank-Automotive industrial integration committees. **Col. Barrett Rogers,** assistant chief of the control branch, has been promoted to the position of chief, and **Lt. Col. George E. Levings** has been named chief of the administration branch of Tank-Automotive Center.

MACHINE TOOLS

. . . **Sales, Inquiries and Market News**

Steps Toward New Fields Taken By Two Producers

Cleveland

• • • **Whatever else** may be said of the machine tool industry as a whole, procrastination is one fault that cannot be laid at its door. At the outset of the war, long before other manufacturers got under way, the industry started on a war-time production scale and has steadily increased this production during the past five years. From an annual dollar volume of business in 1938 of $145,000,000, the industry has just about doubled its production each year until in 1942 the production was valued at $1,320,000,000.

Then, seeing the end to war production, long before it actually arrived, new markets, new products, and new opportunities to aid in the war effort as well as lay the groundwork for post-war business were scanned. This problem, like war production, was realized and at least partially solved before the need became acute.

Typical of individual solutions to the problem were two individual cases. One Massachusetts company is reported about to announce that it is ready to sell a range of induction heating units, a product quite far afield from machine tools but vitally needed today and quite likely to be utilized to an extent far greater than ever before after the war is over. The company has been working on this idea for some time. Now it is ready to go and will market units adaptable to metal hardening, brazing, soldering, melting, and other similar uses.

Another machine tool producer, one of the largest in its field, has been working on trial orders for the manufacture of parts used in engine manufacture. In about another month or so, production will actually begin on a contract scale. In addition, this same company is expected to go into other lines of "production" items as soon as some of the difficulties of such a switch-over can be ironed out. While this is not exactly thinking of a post-war condition, it is definitely doing two things. First, it is fulfilling a need of the moment, that of producing parts and supplies vital to the war effort, and, second, it is familiarizing the company with a new field of manufacture, that of parts or unit production, working as a sub-contractor. This in itself will be valuable to the company, in a post-war period that probably will demand much in the way of consumer and industrial products, but perhaps little in the way of machine tools since all those built during the past five years will still be in service.

•

Orders at Cincinnati Exceeding Cancellations

Cincinnati

• • • **While new business** in this area is indicated as being of a level satisfactory for normal times, builders indicate that it is overbalancing cancellations. Analysis of new business indicates that the demand for all types of machines continues at a steady pace devoid of the hysterical demand of about a year ago. The trade generally has settled down to a steady high volume production with virtually all of the plants in the area running 24 hours a day, 7 days a week. On this basis, of course, the 48-hr. order issued by the President a week ago, does not have any effect because all plants have been exceeding that rate for many months past. Increased loss of man power, however, is noted in some instances, with one or two plants indicating that the last month revealed losses exceeding replacements.

•

Sheffield Corp. and Defiance Machine Works Win Trophies

Cleveland

• • • **The Sheffield Corp.** of Dayton, and the Defiance Machine Works of Defiance, Ohio, have been awarded the National Machine Tool Builders Association trophies offered at the Association's annual meeting held last October, for the greatest fourth-quarter increase in number of machine tools shipped, and in dollar value of shipments, it was announced by Tell Berna, general manager of the Association.

The Sheffield Corp. showed in the fourth quarter of 1942 a 224 per cent increase in dollar value of shipments over the corresponding figure for the third quarter. The Defiance Machine Works showed a fourth quarter increase in number of machine tools shipped of 100 per cent over its third-quarter record.

Follow-Up Program Planned For Job Instructor Training

Cleveland

• • • **With the support** of five large Cleveland concerns, Training Within Industry's national program for following up its work in job instructor training was launched recently at the Cleveland Graphite Bronze Co. plant.

Sometime ago it was felt that a follow-up program would greatly increase the benefits of job instructor training. Joseph S. Kopas, TWI panel consultant and director of testing and guidance at Fenn College, who had done some preliminary work in this direction was assigned to headquarters for three months for this purpose. The five companies which cooperated were: American Steel and Wire Co., National Screw & Mfg. Co., Thompson Products Inc., Cleveland Graphite Bronze Co., and Oglebay-Norton & Co.

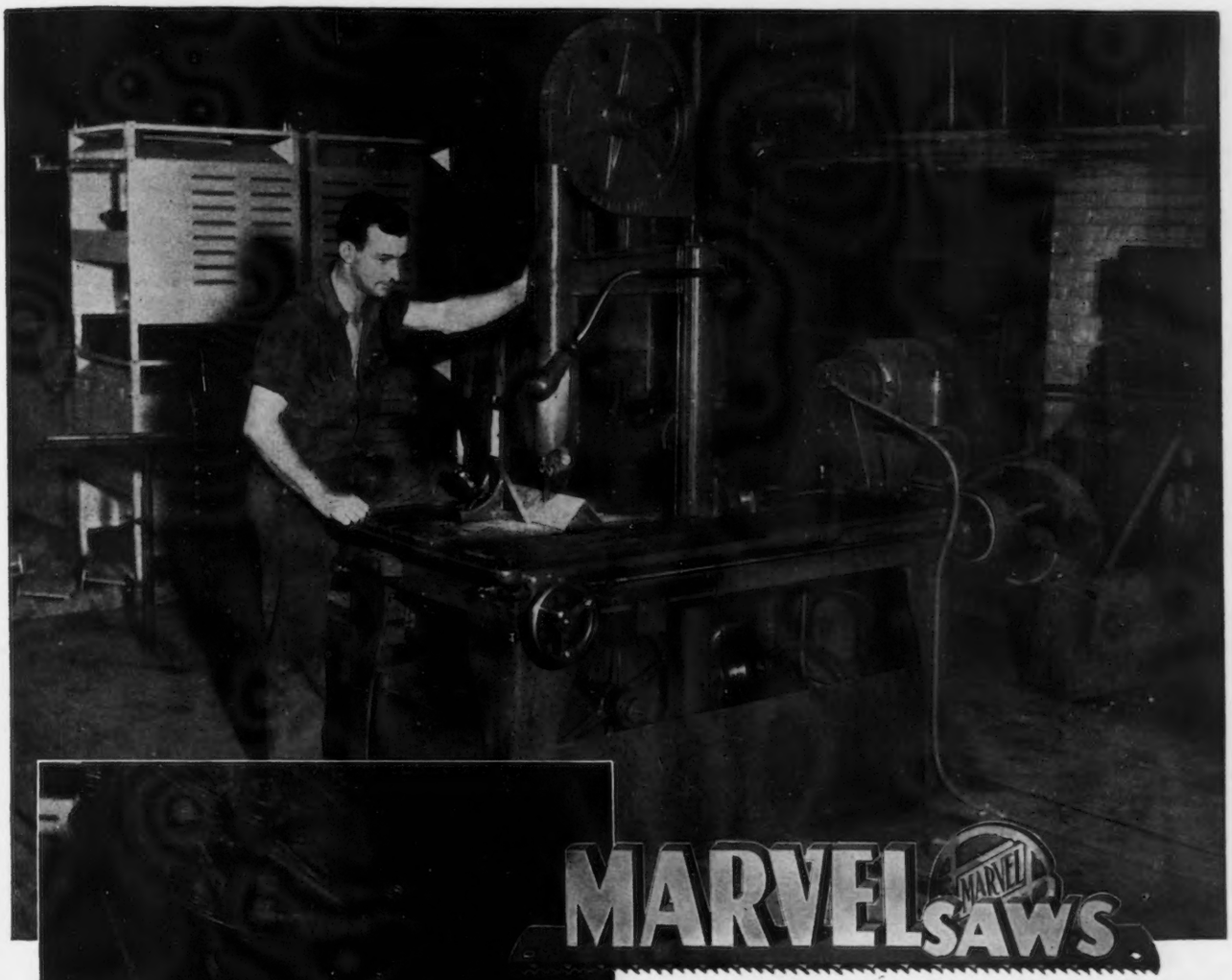
The follow-up program is based on the theory that most supervisors, while they have made good use of job instructor training, need to follow their actual experience in it with some more work in order to get maximum results that are known to be possible. The follow-up program will give at least one person in each plant specific training on how to coach supervisors so that they, in turn, can help those who instruct workers on the job. It will be offered free to all war plants whose supervisors have had the 10-hr. job instructor training program. Regional TWI representatives will handle the program in various parts of the country.

•

Plane Engine Contracts Let

Detroit

• • • **Recent contracts** for Pratt & Whitney aircraft engines will increase present Chevrolet production of such motors five times, M. E. Coyle, general manager of the Chevrolet Motor Division announced. The contract increases which multiply output in this proportion were arranged in less than a year since original agreements were negotiated with the Army Air Forces.



MARVEL SAWS

Mitering a structural angle iron—with a MARVEL No. 8. The blade is fed into the work. Work is held stationary on the bed in quick action vise.

Shipbuilding calls for Universal tools.

There's a lot of sawing — cutting-off, mitering, notching and special cuts wherever ships are being built, and work comes in all sizes too. That's why you'll find MARVEL No. 8 Metal Cutting Band Saws in shipyards and Navy yards, as well as in tool rooms and die shops.

The MARVEL No. 8 is the most universal sawing machine built. It will snip off an 1/8" drill rod or cut off an 18" x 18" structural shape with equal efficiency, or will save hours of machining by roughing work to size and shape. It will cut at any angle from 45° right to 45° left, has a large "T"-slotted table (for holding irregular shapes, special fixtures, etc.) and both power and hand feeds. It is a busy machine wherever found, for it does so many different jobs and does each one well.

ARMSTRONG-BLUM MFG. CO.

"The Hack Saw People"

5700 Bloomingdale Ave., Chicago, U. S. A.
Eastern Sales Office: **225 Lafayette St., New York**

NON-FERROUS METALS

. . . Market Activities and Price Trends

New Emphasis Placed on Use of Secondary Metals

• • • **In opening the symposium** on secondary metals at the annual meeting of the American Institute of Mining and Metallurgical Engineers, F. W. Willard, president, Nassau Smelting & Refining Co. in his paper read before the group said that there was a growing recognition that the secondary metals industry is an essential partner of those engaged in primary production and technology. Of the two large groups of secondary metals, only demolition scrap adds to our resources but it is temporarily vanishing. The other, run-around or fabricating scrap, has become the greatest bulk of secondary metals. How fast this scrap is returned to use depends on the accuracy and care with which its identity is established at its source and the care with which that identity is maintained throughout its processing. "Abruptly and painfully the industry is awakening to the enormity of the crime of degrading scrap by careless habits of segregation and classification."

Copper

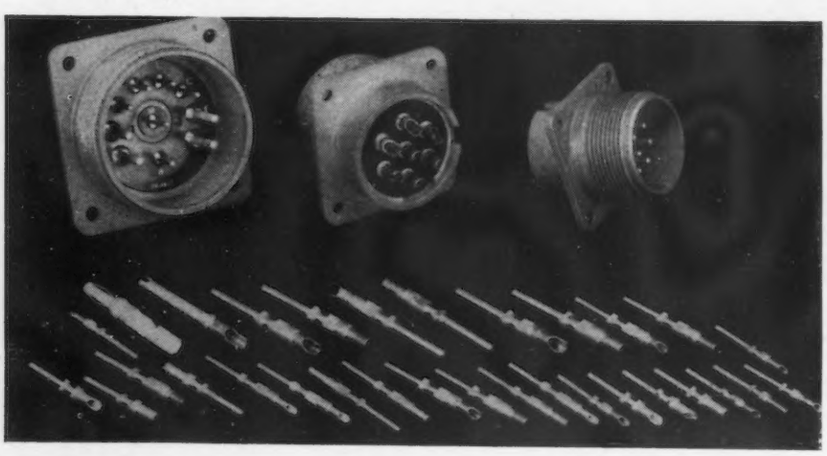
Frederic H. Wright, associate mineral economist, Metal Economic Division, U. S. Bureau of Mines, in discussing "Wartime Changes in the Secondary Metals Industry" said that ingot makers who are faced with an enlarged demand for bronzes to meet rigid Army and Navy specifications, have been unable to find nearly enough scrap of the compositions needed for these alloys, but that the production of other types of secondary brass ingot had apparently broken all previous records during 1942, reflecting a plentiful flow of scrap. The flood of clippings, rod ends, and borings coming from munitions manufacture during 1942 caused severe dislocations in the normal balance between scrap and primary metals consumed in wrought brass. In this past year, brass mills reworked more than twice as much fabricator's scrap as they had in 1941, and their remelting capacity was so overtaxed that secondary smelters were called upon to cast rolling-mill billets from the overflow.

Aluminum

Production of secondary aluminum ingot in 1942 was the greatest on record, Mr. Wright claimed. More aluminum scrap, both old and new, was consumed last year than in any previous year and secondary ingots were allocated in place of the primary metals wherever possible. Segregation of aluminum alloys is of vital importance since there is no commercial method of removing impurities from aluminum alloy scrap except Mg, Cu and Na since aluminum is very easily oxidized. This unfortunate fact is of great significance since the possible return of battle scrap and the certain flow of other obsolete aluminum materials to be expected after the war should logically constitute the first source to be tapped if refining methods now on the way can be developed.

Great Britain and the Soviet Union already remelt crushed aircraft, according to Lt. Col. L. S. Thomas, chief salvage officer, Ordnance Department. If American aircraft scrap were to be returned to this country, it would be impossible to have the troops segregate the aluminum alloys, at the battle fronts. Segregation would be left to the dealer after the scrap had arrived at home ports.

TELLURIUM COPPER: Cable connectors used to be made of silver plated brass. When the silver wore off, conductivity was reduced to that of brass. Those shown above are made of Chase Brass & Copper Co.'s new tellurium copper, an alloy which combines machinability and electrical conductivity.



Copper Division Reorganized

Washington

• • • **Designed to simplify** operations under the CMP plan, Director H. O. King has organized WPB's Copper Division into four staffs and nine operating branches. Direction and coordination of the activities of the division are centered in the office of the director, composed of two deputy directors, Michael Schwarz and J. C. Von Daacke; three special assistants, J. B. Hungate, C. V. Blackburn and J. H. Reed; and a chief statistician, Francis R. Kenney. Staff functions cover Programs, under Mr. Kenney; Distribution, under A. R. Mosler; Resources, under G. B. Holderer, acting chief and Administrative, under V. H. Arnold.

The operating branches, which deal with all phases of the copper industry, are as follows: Primary Production Branch, Frank A. Ayer, Chief; Secondary Production Branch, J. J. Hines, Chief; Brass Mill Branch, J. W. Douglas, Chief; Wire Mill Branch, E. H. Hammond, Jr., Chief; Foundry Branch, L. W. Taylor, Chief; Mill Facilities Branch, F. R. Pyne, Chief; Scrap Branch, G. P. Norton, Chief; Copper Recovery Branch, J. A. Wright, Chief; Conservation Branch, (position vacant).

Alumina Master Plan

• • • **Pointing out** that the supply of native high-grade bauxite for aluminum is limited, Dr. R. S. Dean, assistant director, Bureau of Mines, reported to the A.I.M.E. that the bureau has formulated a master plan whereby sufficient amounts of this vital metal can be obtained through utilization of domestic clays, alunite, second-grade bauxite and other alumina-

Premiums Set for Extra Lead and Zinc

• • • Extra premiums will be paid for lead and zinc produced in excess of monthly production quotas, according to a formal announcement by Jesse Jones. The Metals Reserve Co.'s premium payment program has been broadened to assure maximum production of these metals. The maximum premium applicable to lead produced above the set quota is the difference between the ceiling price and 12c. a lb., New York. For zinc, the highest premium will be the difference between the ceiling price and 13.75c. a lb., East St. Louis, or 16.50c. a lb. East St. Louis, depending upon the quotas of the individual zinc mine.

bearing materials. This program resulted from pilot plant and laboratory research and from the discovery of additional tonnages of available raw materials. The plan, he said, involves questions of major policy with respect to allocation of construction materials, priorities and logistics.

The program has six principal phases: 1. Further exploration of domestic bauxite; 2. Four-fold increase in exploration for second-grade bauxite. 3. Construction of a plant to mill high silica bauxite and produce 1800 tons of first-grade bauxite concentrate daily to supply existing Bayer plants until they can be converted. 4. Construction of commercial plants for extracting alumina from alunite. 6. Continued research in metallurgical and milling problems.

In urging the use of alunite and clays, the bureau has pointed out that even with intensive exploratory work for new bauxite, a milling program and conversion of Bayer plants, the United States still cannot produce sufficient alumina "to place us in a secure position for a long war."

Aluminum Prices Cut March 1 by Alcoa

• • • The Aluminum Co. of America, as a result of the renegotiation of its agreement with the government, has reduced prices on semi-fabricated and fabricated aluminum, Roy A. Hunt, president of the company, announced Feb. 22. The new schedule of prices will be effective March 1.

HEAT-TREATED STEEL SHOT

We manufacture shot and grit for endurance

A shot or grit that will blast fast with a clean finish.

This is the only reason why so many operators are daily changing to our shot and grit, from Maine to California.

The unprecedented demand for our—

Heat-Treated Steel Shot and Heat-Treated Steel Grit

has enabled us to expand our production and maintain a quality that is more than satisfactory to our hundreds of customers all over the country.

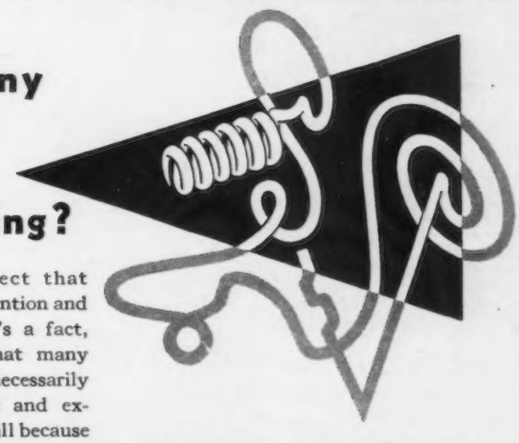
•

HARRISON ABRASIVE CORPORATION

Manchester, New Hampshire

HEAT-TREATED STEEL GRIT

How many BENDS in a Spring?



Here's a subject that deserves close attention and investigation. It's a fact, sad but true, that many springs are unnecessarily intricate, difficult and expensive to make, all because of lack of understanding of the ultimate purpose. Ofttimes, a simplified design—or a different type of material can do wonders in the way of reducing costs and "upping" performance. Here's where experience in spring design pays off. Let the springmaker in on your requirements—in the early stages if possible.

A good spring in time saves nine!

DUNBAR SPRINGMAKERS

SPRINGS WIRE FORMS SMALL STAMPINGS

DUNBAR BROS. CO., Bristol, Conn.

Division of Associated Spring Corporation

SCRAP

. . . Market Activities and Quotation Trends

Lack of Labor Hits at Scrap Supply

• • • The scrap supply situation, as reported generally, is slow with preparation in the yards at a possible new low and the demand from consumers spotty and unreliable. Exceedingly bad weather in some sections has acted to hamper preparation and collections although some yards are said to be cramped with unprepared scrap waiting for both demand and processing.

Still largest difficulty of the yards is the problem of common labor. This problem, although felt generally, has concentrated its worst effects in certain areas. One of these areas, Buffalo, is reported in full in the following article.

Buffalo

• • • **The labor problem** in Buffalo District scrap yards has gone from bad to worse, according to large operators, and the situation now is the most critical in history. With war plants paying higher wages, yard proprietors believe they will have to obtain permission to raise their labor rates from the present 65-70c. level to around 85c. They are not sure even that will work.

Proprietors of small yards are even worse off and at least one owner has had to work through the winter as a laborer barely to keep going. Quality of labor has deteriorated greatly, nearly all applicants sent to the yards having physical defects making them unsuitable for scrap work. One proprietor reports he is using three men who have only one eye each.

However, even physical defects are not saving yard workers from the draft. Lowering of draft standards has resulted in some of these handicapped men being classed 1-A for limited duty.

One big yard is so short of help it cannot operate its shears and press at the same time. The shortage extends all the way down the line and little material is coming in and even less being processed. Only excellent mill stocks relieve the situation.

Charles H. Hirchert, district chief of the salvage division of the WPB has publicly appealed to scrap yard workers to stay on the job. He declared he was in receipt of an official communication from the WMC in Washington listing workmen in the scrap metal industry as among those considered essential to the war program.

"According to the WMC," said Hirchert, "employes of the industry whose job classifications are among those listed as essential under the general heading 'smelting, refining and rolling of metals' in War Manpower Group No. 12 and also in Selective Service Bulletin No. 16 therefore are eligible for deferment from military service."

Hirchert said an index of essential products and services soon to be distributed by the WMC to all U. S. Employment Offices and local draft boards will include under Part 1, Manufacturing, both "salvaging and processing of scrap" and "scrap salvage, sorting and processing."

This classification is not expected by the big operators to do much towards relieving their common labor problem, which, as far as they are concerned seems bound to become even worse before it gets better. "Common labor" virtually has disappeared from the Buffalo industrial area. Factories formerly listing sweepers, for instance, as "laborers" now call them "maintenance men." Office messengers no longer are such but "expediters." Pushers of hand trucks have become "dispatchers." Even the Western Union is advertising for "communication carriers," not messenger boys.

This "glamorizing" of labor plus the extra money readily to be had in war plants has done the scrap yards no good. Theirs seems to be the last business where a laborer still is a laborer.

•

Banking Plan Offers Scrap and Replacements

• • • **Critical metals** for the war effort, to the amount of several million pounds annually, will be gained as a result of action taken recently in Chicago at the annual meeting of the American Washer & Ironer Mfrs.' Assn.

A "scrap bank" system was devised whereby any dealer repairing a washer or ironer will sell the worn out part to a local authorized scrap metal dealer, and will send evidence of the sale to the appliance factory before he can obtain a replacement. The washer-ironer manufacturer in turn will assemble his records and present them to WPB for an allocation of materials from which to make substitute parts for further servicing of appliances.

A scrap bank which will be a model for the industry has been in successful operation several months by the Easy Washing Machine Corp., Syracuse, N. Y. The plan has been approved by WPB.

o o o

10% Turnings to Be Asked in Acid O-H, Electric Furnaces

Milwaukee

• • • **Acid open hearth** and electric furnace operators will soon be asked to take at least 10 per cent of their scrap steel needs in the form of turnings, both alloy-free and low alloy types, an official of the WPB scrap division reported last week at a meeting of foundrymen attending the annual Wisconsin chapter regional foundry conference. This move will be necessary, he said, to help move the large quantities of turnings now on the market.

Discussing the general scrap situation, particularly as it applied to the area near Milwaukee, the scrap executive said that few trolley rails are now left for salvage. The amount of railroad rails which will be available to foundries this year will depend largely upon the quantity of new rails allocated to railroads. The foundry demand for rail steel scrap has increased sharply, he added.

The cast scrap picture was described as erratic. The general expectation is that less cast scrap will be available in 1943 than in 1942, unless auto scrapping operations are speeded up. It is possible that cast scrap may be difficult to get before the year ends.

Consumers were advised to locate scrap sources in industrial plants nearby in order to obtain surer sources of supply and to cut down the use of shipping facilities.

Scrap Drive Planned To Hold Yard Labor

Pittsburgh

• • • **Despite talk** about the plentiful supply of scrap, plans are being made in Harrisburg for a state wide scrap drive beginning March 1 and continuing until April 30. While the situation appears easier scrap leaders feel that there should be no letdown in the search for scrap and claim that if dealers do not have scrap coming in to them, they may, in even larger numbers, leave this business for war jobs and thus create a weak link in that section of the scrap business.

•

BUFFALO—The coldest weather in 69 years hampered scrap yard operations in the Buffalo district this week. Operators reported very little material was moved. The turnings situation remains in an uproar, mills remaining firm on their recent embargo.

•

PHILADELPHIA—Activities are quiet with even low-phos plate slow in moving. It is believed, however, that mills here are beginning to feel the slackened shipments. Shipments in January were estimated to be 25 per cent under December, and for February are still lower. Not much improvement is expected in March. Some battle scrap of unidentified nature is reported to have come into Norfolk.

•

CINCINNATI—The market in this area is without interesting new feature. Consumers generally appear to be in fairly comfortable position, causing some to become more technical about the quality of scrap they accept. Scarcity of man power, however, continues to plague dealers and actual yard preparation and movement of scrap is being somewhat retarded.

•

NEW YORK—In spite of the scrap industry's classification as an essential war industry and the WMC's recent advice to scrap workers to stay in it, dealers report small success with appeals for deferment of their workers. It is believed also that small dealers will soon follow the peddlers into business oblivion. Very little scrap is reported moving; the only demand existing is for electric furnace grades.

•

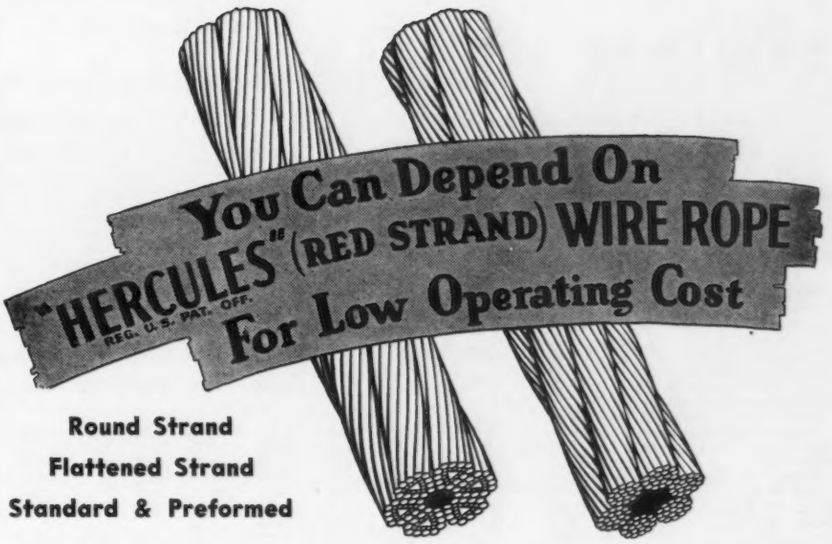
BIRMINGHAM — Southern steel mills are continuing to obtain considerable tonnages of railroad scrap of good quality. Supplies of agricultural and automotive scrap are more than adequate for current needs.

•

CHICAGO—The current warm weather is expected to improve collections, and processing, but shipments to steel mills are still below the rate of consumption.

•

PITTSBURGH—Scrap is moving freely here although there has been a quickening of interest in dealers scrap during the past few days. There are no tight spots and the supply of industrial scrap continues satisfactory.

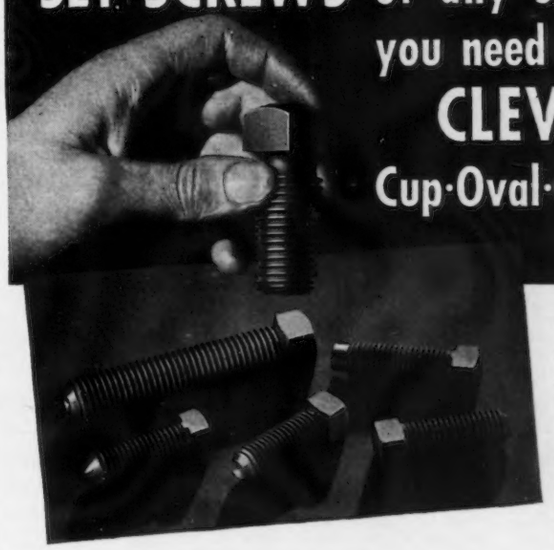


Round Strand
Flattened Strand
Standard & Preformed

WHY not let "HERCULES" (Red-Strand) Wire Rope help you meet present day production requirements and still maintain a reasonable margin of profit? You will quickly discover that "HERCULES" is a dependable ally—not only in today's fight against increasing operating costs—but also in your endeavor to speed up production.

Made Only By **A. LESCHEN & SONS ROPE CO.** *Established 1857*
5909 Kennerly Avenue, St. Louis, Mo.
New York • Chicago • Denver • San Francisco • Seattle • Portland

SET SCREWS of any size or style you need are made by **CLEVELAND**
Cup·Oval·Cone·Flat·Dog



THE CLEVELAND CAP SCREW COMPANY
2917 EAST 79TH STREET • CLEVELAND, OHIO

● Besides your advantage of being able to secure a wide range of styles and sizes in square head or headless Cleveland Set Screws, the assurance of quality is important. Made to close tolerances—Class 3 fit—carefully case hardened—high tensile strength—they meet the most rigid requirements. Write for samples and prices.

Cleveland Cap Screws
Set Screws and Special Upset Parts
Made by the Originators of the Kaufman Process for Greater Strength and Accuracy
Specialists for 26 years in Headed and Threaded Products
WAREHOUSES
CHICAGO: 726 W. Washington Blvd.
PHILADELPHIA . . 12th & Olive Sts.
NEW YORK. . . . . 47 Murray St.
LOS ANGELES . . . 1015 E. 16th St.

IRON AND STEEL (OTHER THAN RAILROAD) SCRAP

(All Prices Are Per Gross Ton)

	BASIC OPEN HEARTH GRADES		BLAST FURNACE GRADES				ELECTRIC FURNACE, ACID OPEN HEARTH AND FOUNDRY GRADES										
							Low Phos.		Heavy Structural and Plate			Foundry Steel					
	No. 1 & 2 Hvy. Melt. No. 1 Cp. Blk. Shts. No. 1 & 2 Bundles No. 1 Busheling	Unbaled* Machine Shop Turnings	Mixed Borings and Turnings	Cast Iron Borings	Shovelling Turnings	No. 2 Busheling	Billet, Bloom, Forge Crops	Bar Crops, Punchings, Plate Scrap and Cast Steel	3 ft. and Under	2 ft. and Under	1 ft. and Under	2 ft. and Under	1 ft. and Under	Auto. Springs, and Crankshafts	Alloy Free Low Phos. and Sulphur Turnings	Heavy Axle and Forge Turn. First Cut	Electric Furnace Bundles
Pittsburgh, Brackenridge, Butler, Monessen, Midland, Johnstown, Sharon, Canton, Steubenville, Warren, Youngstown, Weirton	$20.00	$15.00	$15.00	$16.00	$17.00	$17.50	$25.00	$22.50	$21.50	$22.00	$22.50	$21.50	$22.00	$21.00	$18.00	$19.50	$21.00
Cleveland, Middletown, Cincinnati, Portsmouth	19.50	14.50	14.50	15.50	16.50	17.00	24.50	22.00	21.00	21.50	22.00	21.00	21.50	20.50	17.50	19.00	20.50
Chicago, Claymont, Coatesville, Conshohocken, Harrisburg, Phoenixville, Sparrows Point	18.75	13.75	13.75	14.75	15.75	16.25	23.75	21.25	20.25	20.75	21.25	20.25	20.75	19.75	16.75	18.25	19.75
Ashland, Ky.	19.50	14.50	14.50	15.50	16.50	17.00	24.50	22.00	21.00	21.50	22.00	21.00	21.50	20.50	17.50	19.00	20.50
Buffalo, N. Y.	19.25	14.25	14.25	15.25	16.25	16.75	24.25	21.75	20.75	21.25	21.75	20.75	21.25	20.25	17.25	18.75	20.25
Bethlehem, Pa.; Kokomo, Ind.	18.25	13.25	13.25	14.25	15.25	15.75	23.25	20.75	19.75	20.25	20.75	19.75	20.25	19.25	16.25	17.75	19.25
Duluth, Minn.	18.00	13.00	13.00	14.00	15.00	15.50	23.00	20.50	19.50	20.00	20.50	19.50	20.00	19.00	16.00	17.50	19.00
Detroit, Mich.	17.85	12.85	12.85	13.85	14.85	15.35	22.85	20.35	19.35	19.85	20.35	19.35	19.85	18.85	15.85	17.35	18.85
Toledo, Ohio	.....	12.85	12.85	13.85	14.85	15.35	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
St. Louis, Mo.	17.50	12.50	12.50	13.50	14.50	15.00	22.50	20.00	19.00	19.50	20.00	19.00	19.50	18.50	15.50	17.00	18.50
Atlanta, Ga.; Alabama City, Ala.; Birmingham, Los Angeles; Pittsburg, Cal.; San Francisco	17.00	12.00	12.00	13.00	14.00	14.50	22.00	19.50	18.50	19.00	19.50	18.50	19.00	18.00	15.00	16.50	18.00
Minnequa, Colo.	16.50	11.50	11.50	12.50	13.50	14.00	21.50	19.00	18.00	18.50	19.00	18.00	18.50	17.50	14.50	16.00	17.50
Seattle, Wash.	14.50	9.50	9.50	10.50	11.50	12.00	19.50	17.00	16.00	16.50	17.00	16.00	16.00	15.00	12.50	14.00	15.50

*Baled turnings are $5 per gross ton higher.

BUNDLES: Tin can bundles are $4 below dealers' No. 2 bundles No. 3 bundles are $2 less than No. 1 heavy melting.

AT NEW YORK city or Brooklyn, the maximum shipping point price is $15.33 for No. 1 heavy melting, f.o.b. cars, f.a.s. vessel or loaded on truck. Other grades carry differentials similar to those in table. New Jersey prices must be computed on basis of all-rail. At Boston the maximum is $15.05 for No. 1 f.o.b. cars, f.a.s. vessel or loaded on trucks. Shipments from a New England shipping point to a consumer outside New England carry maximum transportation charge of $6.65 per ton.

SWITCHING CHARGES: Deductions for shipping points within basing points (cents per gross ton) are: Pittsburgh, Brackenridge, 55c.; Midland, Johnstown, Sharon, Youngstown, Warren, Weirton, Cleveland, Toledo, Los Angeles, San Francisco, 42c.; Butler, Monessen, Canton, Steubenville, Cincinnati*, Portsmouth, Ashland, Coatesville, Harrisburg, Phoenixville, Bethlehem, Kokomo, Duluth, St. Louis, 28c.; Buffalo, Claymont, 36c.; Conshohocken, 11c.; Atlanta, Birmingham, 32c.; Pittsburg, Cal., 42c.; Middletown, 14c.; Sparrow's Point, 11c.; Chicago, 84c.; Detroit, 53c.; Alabama City, 26c.; Minnequa, 22c.; Seattle, 38c. *At Cincinnati, for basic open hearth grades, foundry steel and auto springs and crankshafts, deduct 80c. per ton.

PITTSBURGH basing point includes switching districts of Bessemer, Homestead, Duquesne, Munhall and McKeesport, Cincinnati basing point includes Newport, Ky., switching district. St. Louis includes switching districts of Granite City, East St. Louis, Madison, Ill. San Francisco includes switching districts of S. San Francisco, Niles and Oakland, Cal.

MAXIMUM prices of inferior grades shall continue to bear same differential below corresponding grades as existed during the period Sept. 1, 1940, to Jan. 31, 1941. Superior grades cannot be sold at a premium without approval of OPA. Special preparation charges in excess of the above prices are banned. Whenever any electric furnace or foundry grades are purchased for open hearth or blast furnace use, prices may not exceed the prices above for the corresponding open hearth grades.

MAXIMUM SHIPPING POINT PRICE—Where shipment is by rail or vessel, or by combination of rail and vessel, the scrap is at its shipping point when placed f.o.b. railroad car or f.a.s. vessel. In such cases, the maximum shipping point prices shall be: (a) For shipping points located within a basing point, the price listed in the table above for the scrap at the basing point in which the shipping point is located, minus the lowest established switching charge for scrap within the basing point and (b) for shipping points located outside the basing point, the price in table above at the most favorable basing point minus the lowest transportation charge by rail or water or combination thereof. In lieu of dock charge add 75c. a ton*, but 50c. if moved by deck scow or railroad lighter. Shipping by motor vehicle: The scrap is at its shipping point when loaded. For shipping points located within basing points take price listed in table minus applicable switching charge. If located outside a basing point, the price at the most favorable basing point minus lowest established charge for transporting by common carrier. If no established transportation rate exists, the customary costs are deducted. Published dock charges prevail. If unpublished include 75c.* For exceptions see official order.

UNPREPARED SCRAP: For unprepared scrap, maximum prices shall be $3.50 (and in the case of the material from which No. 1, No. 2, and No. 3 bundles are made $4) less the maximum prices for the corresponding grade or grades of prepared scrap. In no case, however, shall electric furnace and foundry grades be used as the "corresponding grade or grades of prepared scrap." Converter may charge $2.50 per ton on consumer-owned unprepared remote scrap (see order). A preparation-in-transit charge for allocated unprepared scrap is provided.

Maximum price of all scrap in a vehicle is that of the lowest price grade in the shipment. This limitation does not apply to vessel shipments if grades are segregated.

Where scrap is to undergo preparation prior to its arrival at the point of delivery, such scrap is not at its shipping point, as that phrase is defined above, until after preparation has been completed. For special preparation charges, consult official order.

CHEMICAL BORINGS: No. 1 (new, clean, containing not more than 1 per cent oil), $1 less than No. 1 heavy melting; No. 2 (new, clean, containing not more than 1.5 per cent oil), $2 less than No. 1 heavy melting. If loaded in box cars add 75c.

UNPREPARED CAST IRON SCRAP—Except for heavy breakable cast, unprepared scrap is given a price ceiling of $2.50 per ton less than the maximum prices for the corresponding grade of prepared cast iron scrap. Where scrap is to undergo preparation prior to arrival at the point of delivery, such scrap is not considered at shipping point until preparation is completed.

Consumers of cast scrap may pay the shipping point price plus established charge for transporting the scrap to their plants. In the case of deliveries by truck, the cast scrap buyer must obtain from the seller a certification, made out to OPA.

*At Memphis 50c.; Great Lakes ports $1; New England $1.25.

RAILROAD SCRAP

	No. 1 RR Heavy Melting	Scrap Rails	Rails for Rerolling	Scrap Rails: 3 ft. and Under	Scrap Rails: 2 ft. and Under	Scrap Rails: 18 in. and Under
Cleveland, Cincinnati, Ashland, Portsmouth, Middletown	$20.50	$21.50	$23.00	$23.50	$23.75	$24.00
Canton, Pittsburgh Sharon, Steubenville, Wheeling, Youngstown	21.00	22.00	23.50	24.00	24.25	24.50
Chicago, Philadelphia, Sparrows Pt., Wilmington	19.75	20.75	22.25	22.75	23.00	23.25
Birmingham, Los Angeles, San Francisco	18.00	19.00	20.50	21.00	21.25	21.50
Buffalo	20.25	21.25	22.75	23.25	23.50	23.75
Detroit	18.85	19.85	21.35	21.85	22.10	22.35
Duluth	19.00	20.00	21.50	22.00	22.25	22.50
Kansas City, Mo.	17.00	18.00	19.50	20.00	20.25	20.50
Kokomo, Ind.	19.25	20.25	21.75	22.25	22.50	22.75
Seattle	15.50	16.50	18.00	18.50	18.75	19.00
St. Louis	18.50	19.50	21.00	21.50	21.75	22.00

CAST IRON SCRAP

	Group A	Group B	Group
No. 1 cupola cast	$18.00	$19.00	$20.00
Clean auto cast	18.00	19.00	20.00
Unstripped motor blocks	15.50	16.50	17.50
Stove Plate	17.00	18.00	19.00
Heavy Breakable Cast	15.50	16.50	17.50
Charging Box Size Cast	17.00	18.00	19.00
Misc. Malleable	20.00	21.00	22.00

Group A includes the states of Montana, Idaho, Wyoming, Nevada, Utah, Arizona and New Mexico.

Group B includes the states of North Dakota, South Dakota, Nebraska, Colorado, Kansas Oklahoma, Texas and Florida.

Group C: States not named in A and B; switching district of Kansas City, Kan., Mo.

. . . Comparison of Prices

Advances Over Past Week in **Heavy Type**; Declines in *Italics*. [Prices Are F.O.B. Major Basing Points]

Flat Rolled Steel: (Cents Per Lb.)	Feb. 23, 1943	Feb. 16, 1943	Jan. 26, 1943	Feb. 24, 1942
Hot rolled sheets	2.10	2.10	2.10	2.10
Cold rolled sheets	3.05	3.05	3.05	3.05
Galvanized sheets (24 ga.)	3.50	3.50	3.50	3.50
Hot rolled strip	2.10	2.10	2.10	2.10
Cold rolled strip	2.80	2.80	2.80	2.80
Plates	2.10	2.10	2.10	2.10
Plates, wrought iron	3.80	3.80	3.80	3.80
Stain's c.r. strip (No. 302)	28.00	28.00	28.00	28.00
Tin and Terne Plate: (Dollars Per Base Box)				
Tin plate, standard cokes	$5.00	$5.00	$5.00	$5.00
Tin plate, electrolytic	4.50	4.50	4.50	4.50
Special coated mfg. ternes	4.30	4.30	4.30	4.30
Bars and Shapes: (Cents Per Lb.)				
Merchant bars	2.15	2.15	2.15	2.15
Cold finished bars	2.65	2.65	2.65	2.65
Alloy bars	2.70	2.70	2.70	2.70
Structural shapes	2.10	2.10	2.10	2.10
Stainless bars (No. 302)	24.00	24.00	24.00	24.00
Wrough iron bars	4.40	4.40	4.40	4.40
Wire and Wire Products: (Cents Per Lb.)				
Plain wire	2.60	2.60	2.60	2.60
Wire nails	2.55	2.55	2.55	2.55
Rails: (Dollars Per Gross Ton)				
Heavy rails	$40.00	$40.00	$40.00	$40.00
Light rails	40.00	40.00	40.00	40.00
Semi-Finished Steel: (Dollars Per Gross Ton)				
Rerolling billets	$34.00	$34.00	$34.00	$34.00
Sheet bars	34.00	34.00	34.00	34.00
Slabs	34.00	34.00	34.00	34.00
Forging billets	40.00	40.00	40.00	40.00
Alloy blooms, billets, slabs	54.00	54.00	54.00	54.00
Wire Rods and Skelp: (Cents Per Lb.)				
Wire rods	2.00	2.00	2.00	2.00
Skelp (grvd)	1.90	1.90	1.90	1.90

Pig Iron: (Per Gross Ton)	Feb. 23, 1943	Feb. 16, 1943	Jan. 26, 1943	Feb. 24, 1942
No. 2 fdy., Philadelphia	$25.89	$25.89	$25.89	$25.84
No. 2, Valley furnace	24.00	24.00	24.00	24.00
No. 2, Southern Cin'ti	24.68	24.68	24.68	24.06
No. 2, Birmingham	20.38	20.38	20.38	20.38
No. 2, foundry, Chicago†	24.00	24.00	24.00	24.00
Basic, del'd eastern Pa.	25.39	25.39	25.39	25.34
Basic, Valley furnace	23.50	23.50	23.50	23.50
Malleable, Chicago†	24.00	24.00	24.00	24.00
Malleable, Valley	24.00	24.00	24.00	24.00
L. S. charcoal, Chicago	31.34	31.34	31.34	31.34
Ferromanganese‡	135.00	135.00	135.00	120.00

†The switching charge for delivery to foundries in the Chicago district is 60c. per ton.
‡For carlots at seaboard.

Scrap: (Per Gross Ton)				
Heavy melting steel, P'gh.	$20.00	$20.00	$20.00	$20.00
Heavy melt'g steel, Phila.	18.75	18.75	18.75	18.75
Heavy melt'g steel, Ch'go	18.75	18.75	18.75	18.75
No. 1 hy. comp. sheet, Det.	17.85	17.85	17.85	17.85
Low phos. plate, Youngs'n	22.50	22.50	22.50	23.00
No. 1 cast, Pittsburgh	20.00	20.00	20.00	20.00
No. 1 cast, Philadelphia	20.00	20.00	20.00	20.00
No. 1 cast, Ch'go	20.00	20.00	20.00	20.00
Coke, Connellsville: (Per Net Ton at Oven)				
Furnace coke, prompt	$6.50	$6.50	$6.00	$6.00
Foundry coke, prompt	7.375	7.375	6.875	6.875
Non-Ferrous Metals: (Cents per Lb. to Large Buyers)				
Copper, electro., Conn.	12.00	12.00	12.00	12.00
Copper, Lake, New York	12.00	12.00	12.00	12.00
Tin (Straits), New York	52.00	52.00	52.00	52.00
Zinc, East St. Louis	8.25	8.25	8.25	8.25
Lead, St. Louis	6.35	6.35	6.35	6.35
Aluminum, Virgin, del'd.	15.00	15.00	15.00	15.00
Nickel, electrolytic	35.00	35.00	35.00	35.00
Magnesium, ingot	20.50	20.50	20.50	22.50
Antimony (Asiatic), N. Y.	16.50	16.50	16.50	16.50

The various basing points for finished and semi-finished steel are listed in the detailed price tables, pages 133 to 138.

Composite Prices . . .

	FINISHED STEEL	PIG IRON	SCRAP STEEL
Feb. 23, 1943	2.30467c. a Lb.	$23.61 a Gross Ton	$19.17 a Gross Ton
One week ago	2.30467c. a Lb.	$23.61 a Gross Ton	$19.17 a Gross Ton
One month ago	2.30467c. a Lb.	$23.61 a Gross Ton	$19.17 a Gross Ton
One year ago	2.30467c. a Lb.	$23.61 a Gross Ton	$19.17 a Gross Ton

	FINISHED STEEL HIGH	FINISHED STEEL LOW	PIG IRON HIGH	PIG IRON LOW	SCRAP STEEL HIGH	SCRAP STEEL LOW
1943	2.30467c.,	2.30467c.,	$23.61	$23.61	$19.17	$19.17
1942	2.30467c.,	2.30467c.,	23.61	23.61	19.17	19.17
1941	2.30467c.,	2.30467c.,	$23.61, Mar. 20	$23.45, Jan. 2	$22.00, Jan. 7	$19.17, Apr. 10
1940	2.30467c., Jan. 2	2.24107c., Apr. 16	23.45, Dec. 23	22.61, Jan. 2	21.83, Dec. 30	16.04, Apr. 9
1939	2.35367c., Jan. 3	2.26689c., May 16	22.61, Sept. 19	20.61, Sept. 12	22.50, Oct. 3	14.08, May 16
1938	2.58414c., Jan. 4	2.27207c., Oct. 18	23.25, June 21	19.61, July 6	15.00, Nov. 22	11.00, June 7
1937	2.58414c., Mar. 9	2.32263c., Jan. 4	23.25, Mar. 9	20.25, Feb. 16	21.92, Mar. 30	12.67, June 9
1936	2.32263c., Dec. 28	2.05200c., Mar. 10	19.74, Nov. 24	18.73, Aug. 11	17.75, Dec. 21	12.67, June 9
1935	2.07642c., Oct. 1	2.06492c., Jan. 8	18.84, Nov. 5	17.83, May 14	13.42, Dec. 10	10.33, Apr. 29
1934	2.15367c., Apr. 24	1.95757c., Jan. 2	17.90, May 1	16.90, Jan. 27	13.00, Mar. 13	9.50, Sept. 25
1933	1.95578c., Oct. 3	1.75836c., May 2	16.90, Dec. 5	13.56, Jan. 3	12.25, Aug. 8	6.75, Jan. 3
1932	1.89196c., July 5	1.83901c., Mar. 1	14.81, Jan. 5	13.56, Dec. 6	8.50, Jan. 12	6.43, July 5
1931	1.99626c., Jan. 13	1.86586c., Dec. 29	15.90, Jan. 6	14.79, Dec. 15	11.33, Jan. 6	8.50, Dec. 29
1930	2.25488c., Jan. 7	1.97319c., Dec. 9	18.21, Jan. 7	15.90, Dec. 16	15.00, Feb. 18	11.25, Dec. 9
1929	2.31773c., May 28	2.26498c., Oct. 29	18.71, May 14	18.21, Dec. 17	17.58, Jan. 29	14.08, Dec. 3

Weighted index based on steel bars, beams, tank plates, wire, rails, black pipe, hot and cold-rolled sheets and strip, representing 78 per cent of the United States output. Index recapitulated in Aug. 28, 1941, issue.

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.

Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.

Prices of Finished Iron and Steel...

Steel prices shown here are f.o.b. basing points, in cents per lb., unless otherwise indicated. On some products either quantity deductions or quantity extras apply. In many cases gage, width, cutting, physical, chemical extras, etc., apply to the base price. Actual realized prices to the mill, therefore, are affected by extras, reductions, and in most cases freight absorbed to meet competition. Delivered prices do not reflect new 3 per cent tax on freight rates.

Basing Point → / Product ↓	Pittsburgh	Chicago	Gary	Cleveland	Birmingham	Buffalo	Youngstown	Sparrows Point	Granite City	Middletown, Ohio	Gulf Ports, Cars	Pacific Ports, Cars[10]	DELIVERED TO Detroit	New York	Philadelphia
SHEETS															
Hot rolled	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.20¢	2.10¢		2.65¢	2.22¢	2.35¢	2.28¢
Cold rolled[1]	3.05¢	3.05¢	3.05¢	3.05¢		3.05¢	3.05¢		3.15¢	3.05¢		3.70¢	3.17¢	3.41¢	3.39¢
Galvanized (24 ga.)	3.50¢	3.50¢	3.50¢		3.50¢	3.50¢	3.50¢	3.50¢	3.60¢	3.50¢		4.05¢		3.75¢	3.68¢
Enameling (20 ga.)	3.35¢	3.35¢	3.35¢	3.35¢			3.35¢		3.45¢	3.35¢		4.00¢	3.47¢	3.73¢	3.69¢
Long ternes[3]	3.80¢		3.80¢									4.55¢		4.18¢	4.14¢
STRIP															
Hot rolled[8]	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢			2.10¢		2.75¢	2.22¢	2.48¢	
Cold rolled[4]	2.80¢	2.90¢		2.80¢			2.80¢	(Worcester = 3.00¢)					2.92¢	3.18¢	
Cooperage stock	2.20¢	2.20¢			2.20¢		2.20¢							2.58¢	
Commodity C-R	2.95¢			2.95¢			2.95¢	(Worcester = 3.35¢)					3.07¢	3.33¢	
TIN MILL PRODUCTS															
Coke tin plate, base box	$5.00	$5.00	$5.00						$5.10					5.38¢	5.34¢
Electrolytic tin plate, box	$4.50		$4.50												
Black plate, 29 gage[5]	3.05¢	3.05¢	3.05¢						3.15¢			4.05¢[12]			3.39¢
Mfg. ternes, special box	$4.30	$4.30	$4.30						$4.40						
BARS															
Carbon steel	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢		(Duluth = 2.25¢)			2.52¢	2.80¢	2.27¢	2.51¢	2.49¢
Rail steel[8]	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢					2.52¢	2.80¢			
Reinforcing (billet)[7]	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢			2.52¢	2.55¢[13]	2.27¢	2.40¢	
Reinforcing (rail)[7]	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢				2.52¢	2.55¢[13]	2.27¢		2.49¢
Cold finished[8]	2.65¢	2.65¢	2.65¢	2.65¢		2.65¢			(Detroit = 2.70c)					3.01¢	2.99¢
Alloy, hot rolled	2.70¢	2.70c				2.70¢		Bethlehem, Massillon, Canton = 2.70c)					2.82¢		
Alloy, cold drawn	3.35¢	3.35¢	3.35¢	3.35¢		3.35¢							3.47¢		
PLATES								(Coatesville and Claymont = 2.10¢)							
Carbon steel	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢	2.25¢[11]		2.47¢	2.65¢	2.33¢	2.30¢	2.155¢
Floor plates	3.35¢	3.35¢									3.72¢	4.00¢		3.73¢	3.69¢
Alloy	3.50¢	3.50¢			(Coatesville = 3.50¢)						3.97¢	4.15¢		3.71¢	3.60¢
SHAPES															
Structural	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢		(Bethlehem = 2.10¢)			2.47¢	2.75¢		2.28¢	2.22¢
SPRING STEEL, C-R															
0.26 to 0.50 Carbon	2.80¢			2.80¢			(Worcester = 3.00¢)								
0.51 to 0.75 Carbon	4.30¢			4.30¢			(Worcester = 4.50¢)								
0.76 to 1.00 Carbon	6.15¢			6.15¢			(Worcester = 6.35¢)								
1.01 to 1.25 Carbon	8.35¢			8.35¢			(Worcester = 8.55¢)								
WIRE[9]															
Bright[14]	2.60¢	2.60¢		2.60¢	2.60¢		(Worcester = 2.70c)					3.10¢			2.94¢
Galvanized	add proper size extra and galvanized extra to bright wire base, above.														
Spring (High Carbon)	3.20¢	3.20¢		3.20¢			(Worcester = 3.30¢)					3.70¢			3.54¢
PILING															
Steel sheet	2.40¢	2.40¢				2.40¢						2.95¢			2.74¢

[1] Mill run sheets are 10c. per 100 lb. less than base; and primes only, 25c. above base. [2] Unassorted 8-lb. coating. [3] Widths up to 12 in. [4] Carbon 0.25 per cent and less. [5] Applies to certain width and length limitations. [6] For merchant trade. [7] Prices for straight length material only, from a producer to a consumer. Functional discount of 25c. per 100 lb. to fabricators. [8] Also shafting. For quantities of 20,000 to 39,999 lb. [9] Carload lot to manufacturing trade. [10] These prices do not apply if the customary means of transportation (rail and water) are not used. [11] Ship plates only. [12] Boxed. [13] Portland and Seattle price, San Francisco price is 2.50c. [14] This bright wire base price to be used in figuring annealed and bright finish wires, commercial spring wire and galvanized wire.

GOVERNMENT CEILINGS—Price Schedule No. 6 issued April 16, 1941, governs steel mill prices; Price Schedule No. 49 governs warehouse prices, which are on another page of this issue.

EXCEPTIONS TO PRICE SCHEDULE No. 6—On hot rolled carbon bars, Phoenix Iron Co. may quote 2.40c. at established basing points; Calumet Steel division of Borg Warner may quote 2.35c., Chicago, on bars from its 8 in. mill; Joslyn Mfg. Co. may quote 2.35c., Chicago base On rail steel bars Sweets Steel Co. may quote 2.33c., f.o.b. mill. On hot rolled sheets, Andrews Steel Co. may quote for shipment to Detroit area on Middletown base. On galvanized sheets, Andrews Steel may quote 3.75c., at established basing points. On hot rolled strip, Joslyn Mfg. Co. may quote 2.30c., Chicago base. On plates, Granite City Steel Co. may quote 2.35c., f.o.b. mill, and Central Iron & Steel Co. may quote 2.20c., f.o.b. basing points. On shapes, Phoenix Iron Co. may quote 2.35c., established basing points and 2.50c. Phoenixville for export.

On rail steel merchant bars, Eckels-Nye Corp. may charge 2.40c. On tubing, South Chester Tube Co. may price Gulf or Pacific Coast all-rail shipments and shipments west of Harrisburg on basis of f.o.b. Chester. On lend-lease sales to eastern seaboard, Sheffield Steel Co. and Colorado Fuel & Iron Corp. may sell f.o.b. mill. SEMI-FINISHED STEEL—Follansbee Steel Corp. may sell forging billets at $49.50 f.o.b. Toronto; Continental Steel Corp. may sell Acme Steel Co. at $34 for rerolling billets plus extras and freight; Ford Motor Co. may sell rerolling billets at $34 f.o.b. Dearborn; Andrews Steel Co. may sell forging billets at $50 at established basing points and slabs at $41; Empire Sheet and Tin Plate may sell slabs at $41 at established basing points and sheet bars at $39 f.o.b. mill; on lend lease sales Northwestern Steel & Wire Co. may charge $41 per gross ton f.o.b. mill for rerolling billets; and lend lease sales Wheeling Steel Corp. may charge $36 per ton for small billets, f.o.b. Portsmouth and $37 per ton sheet bars f.o.b. Portsmouth; Laclede Steel Co. on semifinished sales for lend-lease shipped to eastern seaboard may use Chicago basing point prices f.o.b. Alton and Madison, Ill. ALLOY STEEL BARS—Texas Steel Co. may use Chicago base f.o.b. Fort Worth.

SEMI-FINISHED STEEL

For exceptions, see preceding page

Billets, Blooms and Slabs

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point (rerolling only). Prices delivered Detroit are $2.25 higher; f.o.b. Duluth, billets only, $2 higher. Delivered prices do not reflect new per cent tax on freight rates.

	Per Gross Ton
Rerolling	$34.00
Forging quality	40.00
Alloy Steel: Pittsburgh, Chicago, Canton, Massillon, Buffalo, or Bethlehem, per gross ton	$54.00

Shell Steel

	Per Gross Ton
3 in. to 12 in.	$52.00
12 in. to 18 in.	54.00
18 in. and over	56.00

Basic open hearth shell steel, f.o.b. Pittsburgh, Chicago, Buffalo, Gary, Cleveland, Youngstown and Birmingham.

Prices delivered Detroit are $2.25 higher.

Note: The above base prices apply on lots of 1000 tons of a size and section to which are to be added extras for chemical requirements, cutting, or quantity.

Sheet Bars

Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.

	Per Gross Ton
Open hearth or bessemer	$34.00

Skelp

Pittsburgh, Chicago, Youngstown, Coatesville, Pa., Sparrows Point, Md.

	Per Lb.
Grooved, universal and sheared	1.90c.

Wire Rods

(No. 5 to 9/32 in.)

	Per Lb.
Pittsburgh, Chicago, Cleveland	2.00c.
Worcester, Mass.	2.10c.
Birmingham	2.00c.
San Francisco	2.50c.
Galveston	2.25c.

9/32 in. to 47/64 in., 0.15c. a lb. higher. Quantity extras apply.

TOOL STEEL

(F.o.b. Pittsburgh, Bethlehem, Syracuse)

	Base per lb.
High speed	67c.
Straight molybdenum	54c.
Tungsten-molybdenum	57½c.
High-carbon-chromium	43c.
Oil hardening	24c.
Special carbon	22c.
Extra carbon	18c.
Regular carbon	14c.

Warehouse prices east of Mississippi are 2c. a lb. higher; west of Mississippi, 3c. higher.

CORROSION AND HEAT-RESISTING STEEL

(Per lb. base price, f.o.b. Pittsburgh)

Chromium-Nickel Alloys

	No. 304	No. 302
Forging billets	21.25c.	20.40c.
Bars	25.00c.	24.00c.
Plates	29.00c.	27.00c.
Structural shapes	25.00c.	24.00c.
Sheets	36.00c.	34.00c.
Hot rolled strip	23.50c.	21.50c.
Cold rolled strip	30.00c.	28.00c.
Drawn wire	25.00c.	24.00c.

Straight-Chromium Alloys

	No. 410	No. 430	No. 442	No. 446
F.Billets	15.725c.	16.15c.	19.125c.	23.375c.
Bars	18.50c.	19.00c.	22.50c.	27.50c.
Plates	21.50c.	22.00c.	25.50c.	30.50c.
Sheets	26.50c.	29.00c.	32.50c.	36.50c.
Hotstrip	17.00c.	17.50c.	24.00c.	35.00c.
Cold st.	22.00c.	22.50c.	32.00c.	52.00c.

Chromium-Nickel Clad Steel (20%)

	No. 304
Plates	18.00c.*
Sheets	19.00c.

*Includes annealing and pickling.

NATIONAL EMERGENCY STEELS (Hot Rolled)

Extras for Alloy Content

Designation	CHEMICAL COMPOSITION LIMITS, PER CENT								Basic Open-Hearth		Electric Furnace	
	Carbon	Manganese	Phosphorus Max.	Sulphur Max.	Silicon	Chromium	Nickel	Molybdenum	Bars and Bar Strip	Billets, Blooms and Slabs	Bars and Bar Strip	Billets, Blooms and Slabs
NE 1330	.28/ .33	1.60/1.90	.040	.040	.20/ .35				.10c	$2.00		
NE 1335	.33/ .38	1.60/1.90	.040	.040	.20/ .35				.10	2.00		
NE 1340	.38/ .43	1.60/1.90	.040	.040	.20/ .35				.10	2.00		
NE 1345	.43/ .48	1.60/1.90	.040	.040	.20/ .35				.10	2.00		
NE 1350	.48/ .53	1.60/1.90	.040	.040	.20/ .35				.10	2.00		
NE 8020	.18/ .23	1.00/1.30	.040	.040	.20/ .35			.10/ .20	.45	9.00	.95c	$19.00
NE 8442*	.40/ .45	1.30/1.60	.040	.040	.20/ .35			.30/ .40	.90	18.00	1.40	28.00
NE 8613	.12/ .17	.70/ .90	.040	.040	.20/ .35	.40/ .60	.40/ .70	.15/ .25	.75	15.00	1.25	25.00
NE 8615	.13/ .18	.70/ .90	.040	.040	.20/ .35	.40/ .60	.40/ .70	.15/ .25	.75	15.00	1.25	25.00
NE 8617	.15/ .20	.70/ .90	.040	.040	.20/ .35	.40/ .60	.40/ .70	.15/ .25	.75	15.00	1.25	25.00
NE 8620	.18/ .23	.70/ .90	.040	.040	.20/ .35	.40/ .60	.40/ .70	.15/ .25	.75	15.00	1.25	25.00
NE 8630	.28/ .33	.70/ .90	.040	.040	.20/ .35	.40/ .60	.40/ .70	.15/ .25	.75	15.00	1.25	25.00
NE 8635	.33/ .38	.75/1.00	.040	.040	.20/ .35	.40/ .60	.40/ .70	.15/ .25	.75	15.00	1.25	25.00
NE 8637	.35/ .40	.75/1.00	.040	.040	.20/ .35	.40/ .60	.40/ .70	.15/ .25	.75	15.00	1.25	25.00
NE 8640	.38/ .43	.75/1.00	.040	.040	.20/ .35	.40/ .60	.40/ .70	.15/ .25	.75	15.00	1.25	25.00
NE 8642	.40/ .45	.75/1.00	.040	.040	.20/ .35	.40/ .60	.40/ .70	.15/ .25	.75	15.00	1.25	25.00
NE 8645	.43/ .48	.75/1.00	.040	.040	.20/ .35	.40/ .60	.40/ .70	.15/ .25	.75	15.00	1.25	25.00
NE 8650	.48/ .53	.75/1.00	.040	.040	.20/ .35	.40/ .60	.40/ .70	.15/ .25	.75	15.00	1.25	25.00
NE 8720	.18/ .23	.70/ .90	.040	.040	.20/ .35	.40/ .60	.40/ .70	20/ 30	.80	16.00	1.30	26.00
NE 9255	.50/ .60	.70/ .95	.040	.040	1.80/2.20				.40c	8.00		
NE 9260	.55/ .65	.75/1.00	.040	.040	1.80/2.20				.40	8.00		
NE 9262	.55/ .65	.75/1.00	.040	.040	1.80/2.20	.20/ .40			.65	13.00		
NE 9415	.13/ .18	.80/1.10	.040	.040	.40/ .60	.20/ .40	.20/ .50	.08/ .15	.80	16.00	1.30c	$26.00
NE 9420	.18/ .23	.80/1.10	.040	.040	.40/ .60	.20/ .40	.20/ .50	.08/ .15	.80	16.00	1.30	26.00
NE 9422	.20/ .25	.80/1.10	.040	.040	.40/ .60	.20/ .40	.20/ .50	.08/ .15	.80	16.00	1.30	26.00
NE 9430	.28/ .33	.90/1.20	.040	.040	.40/ .60	.20/ .40	.20/ .50	.08/ .15	.80	16.00	1.30	26.00
NE 9435	.33/ .38	.90/1.20	.040	.040	.40/ .60	.20/ .40	.20/ .50	.08/ .15	.80	16.00	1.30	26.00
NE 9437	.35/ .40	.90/1.20	.040	.040	.40/ .60	.20/ .40	.20/ .50	.08/ .15	.80	16.00	1.30	26.00
NE 9440	.38/ .43	.90/1.20	.040	.040	.40/ .60	.20/ .40	.20/ .50	.08/ .15	.80	16.00	1.30	26.00
NE 9442	.40/ .45	1.00/1.30	.040	.040	.40/ .60	.20/ .40	.20/ .50	.08/ .15	.85	17.00	1.35	27.00
NE 9445	.43/ .48	1.00/1.30	.040	.040	.40/ .60	.20/ .40	.20/ .50	.08/ .15	.85	17.00	1.35	27.00
NE 9450	.48/ .53	1.20/1.50	.040	.040	.40/ .60	.20/ .40	.20/ .50	.08/ .15	.85	17.00	1.35	27.00
NE 9537*	.35/ .40	1.20/1.50	.040	.040	.40/ .60	.40/ .60	.40/ .70	.15/ .25	1.20	24.00	1.70	34.00
NE 9540*	.38/ .43	1.20/1.50	.040	.040	.40/ .60	.40/ .60	.40/ .70	.15/ .25	1.20	24.00	1.70	34.00
NE 9542*	.40/ .45	1.20/1.50	.040	.040	.40/ .60	.40/ .60	.40/ .70	.15/ .25	1.20	24.00	1.70	34.00
NE 9550*	.48/ .53	1.20/1.50	.040	.040	.40/ .60	.40/ .60	.40/ .70	.15/ 25	1.20	24.00	1.70	34.00
NE 9630	.28/ .33	1.20/1.50	.040	.040	.40/ .60	.40/ .60			.80	16.00	1.30	26.00
NE 9635	.33/ .38	1.20/1.50	.040	.040	.40/ .60	.40/ .60			.80	16.00	1.30	26.00
NE 9637	.35/ .40	1.20/1.50	.040	.040	.40/ .60	.40/ .60			.80	16.00	1.30	26.00
NE 9640	.38/ .43	1.20/1.50	.040	.040	.40/ .60	.40/ .60			.80	16.00	1.30	26.00
NE 9642	.40/ .45	1.30/1.60	.040	.040	.40/ .60	.40/ .60			.85	17.00	1.35	27.00
NE 9645	.43/ .48	1.30/1.60	.040	.040	.40/ .60	.40/ .60			.85	17.00	1.35	27.00
NE 9650	.48/ .53	1.30/1.60	.040	.040	.40/ .60	.40/ .60			.85	17.00	1.35	27.00

***Recommended for large sections only.**

Note: The extras shown above are in addition to a base price of 2.70c. per 100 lb., on finished products and $54 per gross ton on semi-finished steel major basing points and are in cents per 100 lb. and dollars per gross ton in semi-finished.

ELECTRICAL SHEETS

(Base, f.o.b. Pittsburgh)

	Per Lb.
Field grade	3.20c.
Armature	3.55c.
Electrical	4.05c.
Motor	4.95c.
Dynamo	5.65c.
Transformer 72	6.15c.
Transformer 65	7.15c.
Transformer 58	7.65c.
Transformer 52	8.45c.

F.o.b. Granite City, add 10c. per 100 lb. on field grade to and including dynamo. Pacific ports add 75c. per 100 lb. on all grades.

WIRE PRODUCTS

To the trade, f.o.b. Pittsburgh, Chicago, Cleveland, Birmingham

	Base per Keg
Standard wire nails	$2.55
Coated nails	2.55
Cutnails, carloads	3.85
	Base per 100 Lb.
Annealed fence wire	$3.05
Annealed galvanized fence wire	3.40
	Base Column
Woven wire fence*	67
Fence posts (carloads)	69
Single loop bale ties	59
Galvanized barbed wire†	70
Twisted barbless wire	70

*15½ gage and heavier. †On 80-rod spools in carload quantities.

RAILS, TRACK SUPPLIES

(F.o.b. Mill)

Standard rails, heavier than 60 lb., gross ton	$40.00
Angle bars, 100 lb.	2.70
(F.o.b. Basing Points)	*Per Gross Ton*
Light rails (from billets)	$40.00
Light rails (from rail steel)	39.00
	Base per Lb.
Cut spikes	3.00c.
Screw spikes	5.15c.
Tie plates, steel	2.15c.
Tie plates, Pacific Coast	2.30c.
Track bolts	4.75c.
Track bolts, heat treated, to railroads	5.00c.
Track bolts, jobbers discount	63-5

Basing Points, light rails—Pittsburgh, Chicago, Birmingham; spikes and tie plates—Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; tie plates alone—Steelton, Pa., Buffalo; spikes alone—Youngstown, Lebanon, Pa., Richmond.

ROOFING TERNE PLATE

(F.o.b. Pittsburgh, 112 Sheets)

	20x14 in.	20x28 in.
8-lb. coating I.C.	$6.00	$12.00
15-lb. coating I.C.	7.00	14.00
20-lb. coating I.C.	7.50	15.00

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Machine and Carriage Bolts:

	Per Cent off List
½ in. & smaller x 6 in. & shorter	65½
9/16 & ⅝ in. x 6 in. & shorter	63½
¾ to 1 in. x 6 in. & shorter	61
1⅛ in. and larger, all length	59
All diameters over 6 in. long	59
Lag, all sizes	62
Plow bolts	65

Nuts, Cold Punched or Hot Pressed:
(Hexagon or Square)

½ in. and smaller	62
9/16 to 1 in. inclusive	59
1⅛ to 1½ in. inclusive	57
1⅝ in. and larger	56

On above bolts and nuts, excepting plow bolts, additional allowance of 10 per cent for full container quantities. There is an additional 5 per cent allowance for carload shipments.

Semi-Fin. Hexagon Nuts	**U.S.S.**	**S.A.E.**
7/16 in. and smaller	..	64
½ in. and smaller	62	..
½ in. through 1 in.	..	60
9/16 to 1 in.	59	..
1⅛ in. through 1½ in.	57	58
1⅝ in. and larger	56	..

In full container lots, 10 per cent additional discount.

Stove Bolts

Packages, nuts loose	71 and 10
In packages, with nuts attached	71
In bulk	80

On stove bolts freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago, New York on lots of 200 lb. or over.

Large Rivets (½ *in. and larger*)

Base per 100 lb.

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham $3.75

Small Rivets (7/16 *in. and smaller*)

Per Cent Off List

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham ..... 65 and 5

Cap and Set Screws

Per Cent Off List

Upset full fin. hexagon head cap screws, coarse or fine thread, up to and incl. 1 in. x 6 in.	64
Upset set screws, cup and oval points	71
Milled studs	46
Flat head cap screws, listed sizes	36
Filister head cap, listed sizes	51

Freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago or New York on lots of 200 lb. or over.

PIG IRON

All prices set in bold face type are maxima established by OPA on June 24, 1941. Other domestic prices (in italics) are delivered quotations per gross ton computed on the basis of the official maxima Delivered prices do not reflect new 3 per cent tax on freight rates.

	No. 2 Foundry	Basic	Bessemer	Malleable	Low Phosphorus	Charcoal
Boston††	*$25.53*	*$25.03*	*$26.53*	*$26.03*	.....	.....
Brooklyn	*27.65*	.....	.....	*28.15*	.....	.....
Jersey City	*26.62*	*26.12*	*27.62*	*27.12*	.....	.....
Philadelphia	*25.89*	*25.39*	*26.89*	*26.39*	.....	.....
Bethlehem, Pa.	$25.00	$24.50	$26.00	$25.50	.....	.....
Everett, Mass.††	25.00	24.50	26.00	25.50	.....	.....
Swedeland, Pa.	25.00	24.50	26.00	25.50	.....	.....
Steelton, Pa.	.....	24.50	.....	.....	$29.50	.....
Birdsboro, Pa.	25.00	24.50	26.00	25.50	29.50	....
Sparrows Point, Md.	25.00	24.50	.....	.....	.....	.....
Erie, Pa.	24.00	23.50	25.00	24.50	.....	.....
Neville Island, Pa.	24.00	23.50	24.50	24.00	.....	.....
Sharpsville, Pa.*	24.00	23.50	24.50	24.00	.....	.....
Buffalo	24.00	23.00	25.00	24.50	29.50	.....
Cincinnati	*24.68*	*24.68*	.....	*25.18*	.....	.....
Canton, Ohio	*25.47*	*24.97*	*25.97*	*25.47*	.....	.....
Mansfield, Ohio	*26.06*	*25.56*	*26.56*	*26.06*	.....	.....
St. Louis	*24.50*	*24.00*	.....	.....	.....	.....
Chicago	24.00	23.50	24.50	24.00	.....	.....*$31.34*
Granite City, Ill.	24.00	23.50	24.50	24.00	.....	.....
Cleveland	24.00	23.50	24.50	24.00	.....	.....
Hamilton, Ohio	24.00	23.50	.....	24.00	.....	.....
Toledo	24.00	23.50	24.50	24.00	.....	.....
Youngstown*	24.00	23.50	24.50	24.00	.....	.....
Detroit	24.00	23.50	24.50	24.00	.....	.....
Lake Superior fc.	.....	.....	.....	.....	.....	$28.00
Lyles, Tenn. fc.†	.....	.....	.....	.....	.....	33.00
St. Paul	*26.76*	.....	*27.26*	*26.76*	.....	.....
Duluth	24.50	24.00	25.00	24.50	.....	.....
Birmingham	20.38	19.00	25.00	.....	.....	.....
Los Angeles	*27.25*	.....	.....	.....	.....	.....
San Francisco	*27.25*	.....	.....	.....	.....	.....
Seattle	*27.25*	.....	.....	.....	.....	.....
Provo, Utah	22.00	21.50	.....	.....	.....	.....
Montreal	*27.50*	*27.50*	.....	*28.00*	.....	.....
Toronto	*25.50*	*25.50*	.....	*26.00*	.....	.....

GRAY FORGE IRON: Valley or Pittsburgh furnace **$23.50**

*Pittsburgh Coke & Iron Co. (Sharpsville, Pa., furnace only) and the Struthers Iron and Steel Co., Struthers, Ohio, may charge 50c. a ton in excess of basing point prices for No. 2 foundry, basic, bessemer and malleable.

**Pittsburgh Ferromanganese Co. (Chester furnace only) may charge $2.25 a ton over maximum basing point prices.

†Price shown is for low-phosphorous iron; high-phosphorous sells for $28.50 at the furnace.

††Eastern Gas & Fuel Associates, Boston, is permitted to sell pig iron produced by its selling company, Mystic Iron Works, Everett, Mass., at $1 per gross ton above maximum prices.

Delta Chemical & Iron Co., Chicago, may charge $30 for charcoal iron at its Delta, Mich., furnace.

Basing point prices are subject to switching charges; silicon differentials (not to exceed 50c. a ton for each 0.25 per cent silicon content in excess of base grade which is 1.75 per cent to 2.25 per cent); phosphorous differentials, a reduction of 38c. per ton for phosphorous content of 0.70 per cent and over; manganese differentials, a charge not to exceed 50c. per ton for each 0.50 per cent manganese content in excess of 1.00 per cent.

WAREHOUSE PRICES *(Delivered Metropolitan areas, per 100 lb. These prices do not necessarily apply for dislocated tonnage shipments when the f.o.b. City prices are used in conformance with OPA Schedule 49)*

CITIES	SHEETS			STRIP		Plates (¼ in. and heavier)	Structural Shapes	BARS			ALLOY BARS		
	Hot Rolled (10 ga.)	Cold Rolled	Galv. (24 ga.)	Hot Rolled	Cold Rolled			Hot Rolled	Cold Finished	Hot Rolled 2300	Hot Rolled 3100	Cold Drawn 2300	Cold Drawn 3100
Pittsburgh	$3.35	$4.00	$4.75	$3.60	$3.20	$3.40	$3.40	$3.35	$3.65	$7.45	$5.75	$8.40	$6.75
Chicago	3.25	4.10	4.85[1]	3.60	3.50	3.55	3.55	3.50	3.75	7.35	5.65	8.40	6.75
Cleveland	3.35	4.05	4.62	3.50	3.20	3.40	3.58	3.25	3.75	7.55	5.85	8.40	6.75
Philadelphia	3.55	4.63	4.90	3.95	3.31	3.55	3.55	3.85	4.06	7.31	5.86	8.56	7.18
New York	3.58	4.60[2]	5.00	3.96[6]	3.51	3.76	3.75	3.84	4.09	7.60	5.90	8.84	7.19
Detroit	3.43	4.30	4.84[1]	3.43	3.40	3.60	3.65	3.43	3.80	7.67	5.87	8.70	7.05
Buffalo	3.25	4.30[1]	4.75[4]	3.82	3.52	3.62	3.40	3.35	3.75	7.35	5.85	8.40	6.75
Boston	3.71	4.68	5.11	4.06	3.46	3.85	3.85	3.98	4.13	7.77	6.07	8.91	7.26
Birmingham	3.45[3]	4.78	4.75[1]	3.70[3]	....	3.55[3]	3.55[3]	3.50[3]	4.43	....	....	....	....
St. Louis	3.39	4.24[2]	4.99[1]	3.74	3.61	3.69	3.69	3.64	4.02	7.72	6.02	8.77	7.12
St. Paul	3.50	4.35	5.00	3.85	3.83	3.80	3.80	3.75	4.34	7.45	6.00	8.84	7.44
Milwaukee	3.38	4.23[2]	4.98[1]	3.73	3.54	3.68	3.68	3.63	3.88	7.58	5.88	8.63	6.98
Baltimore	3.50	5.00	5.05	4.00	....	3.70	3.70	3.85	4.04	....	....	....	....
Cincinnati	3.42	4.37[2]	4.92[1]	3.67	3.45	3.65	3.68	3.60	4.00	7.69	5.99	8.50	7.10
Norfolk	3.85	4.50	5.40	4.10	....	4.05	4.05	4.00	4.15	....	....	....	....
Washington	3.60	5.10	5.15	4.10	....	3.80	3.80	3.95	4.03	....	....	....	....
Indianapolis	3.45	4.25	5.01[1]	3.75	3.28	3.70	3.70	3.60	3.97	7.67	5.97	8.72	7.07
Omaha	3.85	4.77	5.52[1]	4.20	....	4.15	4.15	4.10	4.42	....	....	....	....
Memphis	3.85	4.66	5.25	4.10	....	3.95	3.95	3.90	4.31	....	....	....	....
New Orleans	3.95	4.95	5.25	4.20	....	3.90	3.90	4.10	4.60	....	....	....	....
Houston	3.75	5.43	5.25	4.30	....	5.25	5.25	3.75	4.50	....	....	....	....
Los Angeles †	4.95	7.15	5.95	4.90	....	4.90	4.60	4.35	5.70	9.55	8.55	10.55	9.55
San Francisco †	4.55	7.55	6.60	4.50	....	4.65	4.35	3.95	5.55	9.80	8.80	10.80	9.80
Seattle †	4.65[7]	6.63	5.70[7]	4.25	....	4.75	4.45	4.20	5.75	....	8.00	....	....

BASE QUANTITIES: Hot rolled sheets, cold rolled sheets, hot rolled strip, plates, shapes and hot rolled bars, 400 to 1999 lb., galvanized sheets, 150 to 1499 lb.; cold rolled strip, extras apply on all quantities; cold finished bars, 1500 lb. and over; SAE bars, 1000 lb. and over. Exceptions: [1] 500 to 1499 lb. [2] 400 to 1499 lb. [3] 400 to 3999 lb. [4] 450 to 1499 lb. [5] 1000 to 1999 lb. [6] 0 to 1999 lb. [7] 300 to 10,000 lb. At Philadelphia galvanized sheets, 25 or more bundles; Boston, cold rolled and galvanized sheets, 450 to 3749 lb.; San Francisco, hot rolled sheets, 400 to 39,999 lb., galvanized and cold rolled sheets, 750 to 4999 lb., cold fin. bars, 0-299 lb.; hot rolled alloy bars, 0-4999 lb.; Seattle, cold finished bars, 1000 lb. and over, hot rolled alloy bars, 0-1999 lb.; Memphis, hot rolled sheets, 400 to 1999 lb., galvanized sheets, 150 and over; St. Paul, galvanized and cold rolled sheets, any quantity, hot rolled bars, plates, shapes, hot rolled sheets, 400 to 14,999 lb.; Los Angeles, hot rolled sheets, bars, plates, cold rolled sheets, 300 to 1999 lb.; galvanized sheets, 1 to 6 bundles; cold finished bars, 1 to 99 lb.; SAE bars, 100 lb. Extras for size, quality, etc., apply on above quotations.

† Los Angeles, San Francisco and Seattle prices reflect special provisions of amendment No. 2 to OPA Price Schedule No. 49.

From Metallurgy...Designing...
Casting...Welding...Machining
...Purchasing...to Inspection

RADIOGRAPHY is helping to get on with the job

RADIOGRAPHY'S unique ability to tell the "inside story"... and to tell it without damage to the part being examined... has a twofold importance. In pointing out defective work, it also points out the way to remedy the trouble and to improve materials, methods, and products.

In shop after shop... department after department... and in plant after plant... radiography is piling up an impressive record of savings—savings in time, materials, manpower, and money.

In Metallurgy, for example, radiography, together with x-ray diffraction, provides vital information about new alloys, methods, and processes.

In Designing, it points the way to best use of materials . . . to the best methods and processes . . . to simplify and lighten parts.

In Casting, it helps in the development of technics . . . in checking production . . . in repairing defects . . . and, by improving quality, it extends the use of castings.

In Welding, its additional information guides the welder . . . aids in training new workers . . . and helps make possible the wider use of welding.

In Machining, costs are reduced substantially by the elimination of expensive man and machine time wasted on defective parts.

In Purchasing, it provides additional information on materials or parts supplied by others.

In Inspection, other methods of testing may be complemented by radiography's nondestructive examination of interior structure and conditions.

And because all this work can be done with greater efficiency and economy . . . and because of greater assurance in the quality of the finished job . . . radiography is important in management's over-all responsibility.

Kodak's part is to supply a line of special films, solutions, and accessories for this work . . . and to make available the experience which has been accumulated in 16 years of research in this field.

EASTMAN KODAK COMPANY

X-RAY DIVISION ROCHESTER, N. Y.

BOILER TUBES

Seamless Steel and Lap Weld Commercial Boiler Tubes and Locomotive Tubes Minimum Wall

(Net base prices per 100 ft. f.o.b. Pittsburgh, in carload lots)

	Seamless Cold Drawn	Seamless Hot Rolled	Lap Weld, Hot Rolled
2 in. o.d. 13 B.W.G.	15.03	13.04	12.38
2½ in. o.d. 12 B.W.G.	20.21	17.54	16.58
3 in. o.d. 12 B.W.G.	22.48	19.50	18.35
3½ in. o.d. 11 B.W.G.	28.37	24.62	23.15
4 in. o.d. 10 B.W.G.	35.20	30.54	28.66

(Extras for less carload quantities)

40,000 lb. or ft. over	Base
30,000 lb. or ft. to 39,999 lb. or ft.	5%
20,000 lb. or ft. to 29,999 lb. or ft.	10%
10,000 lb. or ft. to 19,999 lb. or ft.	20%
5,000 lb. or ft. to 9,999 lb. or ft.	30%
2,000 lb. or ft. to 4,999 lb. or ft.	45%
Under 2,000 lb. or ft.	65%

CAST IRON WATER PIPE

	Per Net Ton
6-in. and larger, del'd Chicago	$54.80
6-in. and larger, del'd New York	52.20
6-in. and larger, Birmingham	46.00
6-in. and larger f.o.b. cars, San Francisco or Los Angeles	69.40
6-in. and larger f.o.b. cars, Seattle	71.20

Class "A" and gas pipe, $3 extra; 4-in. pipe is $3 a ton above 6-in. Prices shown are for lots of less than 200 tons. For 200 tons or over, 6-in. and larger is $45 at Birmingham and $53.80 delivered Chicago. $59.40 at San Francisco and Los Angeles, and $70.20 at Seattle. Delivered prices do not reflect new 3 per cent tax on freight rates.

WELDED PIPE AND TUBING

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

(F.o.b. Pittsburgh only on wrought pipe) Base Price—$200 per Net Ton

Steel (Butt Weld)

	Black	Galv.
½ in.	63½	51
¾ in.	66½	55
1 to 3 in.	68½	57½

Wrought Iron (Butt Weld)

½ in.	25	3½
¾ in.	30	10
1 and 1¼ in.	34	16
1½ in.	38	18½
2 in.	37½	18

Steel (Lap Weld)

2 in.	61	49½
2½ and 3 in.	64	52½
3½ to 6 in.	66	54½

Wrought Iron (Lap Weld)

2 in.	30½	12
2½ to 3 ½ in.	31½	14½
4 in.	33½	18
4½ to 8 in.	32½	17

Steel (Butt, extra strong, plain ends)

	Black	Galv.
½ in.	61½	50½
¾ in.	65½	54½
1 to 3 in.	67	57

Wrought Iron (Same as Above)

½ in.	25	6
¾ in.	31	12
1 to 2 in.	38	19½

Steel (Lap, extra strong, plain ends)

2 in.	59	48½
2½ and 3 in.	63	52½
3½ to 6 in.	66½	56

Wrought Iron (Same as Above)

2 in.	33½	15½
2½ to 4 in.	39	22½
4½ to 6 in.	37½	21

On butt weld and lap weld steel pipe jobbers are granted a discount of 5%. On less-than-carload shipments prices are determined by adding 25 and 30% and the carload freight rate to the base card.

F.o.b. Gary prices are two points lower discount or $4 a ton higher than Pittsburgh or Lorain on lap weld and one point lower discount, or $2 a ton higher on all butt weld.

Ferromanganese

F.o.b. New York, Philadelphia, Baltimore, Mobile or New Orleans, Domestic, 80%, per gross ton (carloads) $135.00

Electrolytic Manganese

99.9% plus, less ton lots, per lb. ... 42c.

Spiegeleisen

Per Gross Ton Furnace

Domestic, 19 to 21%	$36.00
Domestic, 26 to 28%	49.50

Electric Ferrosilicon

(Per Gross Ton, Delivered Lump Size)

50% (carload lots, bulk)	$74.50
50% (ton lots, packed)	87.00
75% (carload lots, bulk)	135.00
75% (ton lots, packed)	151.00

Silvery Iron

(Per Gross Ton, base 6.00 to 6.50 Si)

F.o.b. Jackson, Ohio $29.50*
Buffalo 30.75*
For each additional 0.50% silicon add $1 a ton. For each 0.50% manganese over 1% add 50c. a ton. Add $1 a ton for 0.75% phosphorus or over.

*Official OPA price established June 24, 1941.

Bessemer Ferrosilicon

Prices are $1 a ton above Silvery Iron quotations of comparable analysis.

Ferrochrome

(Per Lb., Contained Cr, Delivered Carlots, Lump Size, on Contract)

4 to 6 carbon	13.00c.
2 carbon	19.50c.
1 carbon	20.50c.
0.10 carbon	22.50c.
0.06 carbon	23.00c.

Silico-Manganese

(Per Gross Ton, Delivered, Carloads, Bulk)

3 carbon	$120.00
2.50 carbon	125.00
2 carbon	130.00
1 carbon	140.00

Spot prices are ¼c. per lb. of contained chromium higher.

Other Ferroalloys

Ferrotungsten, per lb. contained W, del'd carload	$2.00
Ferrovanadium, contract, per lb. contained V, del'd	$2.70 to $2.90†
Grainal—45c. lb., f.o.b. Bridgeville, Pa. Freight allowed 100 lb. and over; maximum based on rate to St. Louis, Mo.	
Bortam—45c. lb. in ton lots; 50c. lb. less than ton, f.o.b. Niagara Falls.	
Ferrocolumbium, per lb. contained Cb, f.o.b. Niagara Falls, N. Y., ton lots	$2.25†
Ferrocarbontitanium, 15-18 Ti, 7-8 C, f.o.b. furnace, carload contract, net ton	$142.50
Ferrocarbontitanium, 17-20 Ti, 3-5 C, f.o.b. furnace, carload contract, net ton	$157.50
Ferrophosphorus, electric or blast furnace materials, carloads, f.o.b. Anniston, Ala., for 18%, with $3 unitage freight, equaled with Rockdale, Tenn., gross ton.	$58.50
Ferrophosphorus, electrolytic 23-26%, carlots, f.o.b. Monsanto (Sigio), Tenn., $3 unitage, freight equalized with Nashville, gross ton	$75.00
Ferromolybdenum, per lb., Mo, f.o.b. furnace	95c.
Calcium molybdate, per lb. Mo, f.o.b. furnace	80c.
Molybdenum oxide briquettes 48-52 Mo, per lb. contained Mo, f.o.b. Langeloth, Pa.	80c.
Molybdenum oxide, in cans, per lb. contained Mo, f.o.b. Langeloth, and Washington, Pa.	80c.
Zirconium, 35-40%, contract basis, carloads in bulk or package, per lb. of alloy	15c.
Alsifer (approx. 20% Al, 40% Si and 40% Fe), contract basis, f.o.b. Niagara Falls, N. Y., per lb.	7.50c.
Limanal (approx. 20% Si, 20% Mn, 20% Al), contract basis, freight allowed, per lb. of alloy, carlots	10.50c.

*Spot prices are $5 per ton higher.
†Spot prices are 10c. per lb. of contained element higher.

LAKE SUPERIOR ORES

(51.50% Fe., Natural Content, Delivered Lower Lake Ports)

	Per Gross Ton
Old range, bessemer, 51.50	$4.75
Old range, non-bessemer, 51.50	4.60
Mesaba, bessemer, 51.50	4.60
Mesaba, non-bessemer, 51.50	4.45
High phosphorus, 51.50	4.35

COKE

Furnace

	Per Net Ton
†Connellsville, prompt	*$6.50

Foundry

†Connellsville, prompt	$6.75 to $7.00
By-product, Chicago	$12.25
By-product, New England	$13.75
By-product, Newark	$12.40 to $12.95
By-product, Philadelphia	$12.38
By-product, Cleveland	$12.30
By-product, Cincinnati	$11.75
By-product, Birmingham	$8.50†
By-product, St. Louis	$12.02
By-product, Buffalo	$12.50

Maximum by-product coke prices established by OPA became effective Oct. 1, 1941.

*Hand-drawn ovens using trucked coal are permitted to charge $7.00 per net ton, plus usual transportation. Maximum beehive furnace coke prices established by OPA, Feb. 8, 1942. †F.O.B. oven.

FLUORSPAR

	Per Net Ton
Domestic washed gravel, 85-5 f.o.b. Kentucky and Illinois mines, all rail	$25.00
Domestic, f.o.b. Ohio River landing barges	25.00
No. 2 lump, 85-5 f.o.b. Kentucky and Illinois mines	25.00

REFRACTORIES

(F.o.b. Works)

Fire Clay Brick

	Per 1000
Super-duty brick, St. Louis	$64.60
First quality, Penna., Md., Ky., Mo. & Ill.	51.30
First quality, New Jersey	56.00
Second quality, Penna., Md., Ky., Mo. & Ill.	46.55
Second quality, New Jersey	51.00
No. 1, Ohio	43.00
Ground fire clay, net ton	7.60

Silica Brick

Pennsylvania & Birmingham	$51.30
Chicago District	58.90
Silica cement, net ton (Eastern)	9.00

Chrome Brick

	Per Net Ton
Standard or chemically bonded, Balt., Plymouth Meeting and Chester	$54.00

Magnesite Brick

Standard, Balt. and Chester	$76.00
Chemically bonded, Baltimore	65.00

Grain Magnesite

Domestic, f.o.b. Balt. and Chester in sacks (carloads)	$44.00
Domestic, f.o.b. Chewelah, Wash. (in bulk)	22.00